Case 20-M-0082- Proceeding on Motion of the Commission Regarding Strategic Use of Energy Related Data

Department of Public Service Staff Whitepaper
Recommendation to Implement an Integrated Energy Data Resource

Dated May 29, 2020

Contents

1 Purpose and Scope

Under the Reforming the Energy Vision (REV) comprehensive energy strategy, New York is transforming its electricity system into one that is cleaner, more resilient, and more affordable.[1] Useful access to useful energy data will play a critical role in this transformation. Unleashing the power of energy data will speed the deployment of clean energy solutions by attracting investment, enabling analytics, identifying operational efficiencies, promoting innovation, and encouraging new business models, which will in-turn create value for customers and the State's energy system.

The New York State Public Service Commission (Commission) directed Department of Public Service Staff (Staff) to "file a whitepaper regarding the creation of an integrated energy data resource that would provide a platform for access to customer and system data."[2] The Commission further directed Staff to consider energy data initiatives in other in other jurisdictions and to include recommendations for stakeholder engagement, data resource design, data resource use cases, implementation, and operation.[3]

This whitepaper begins with background information regarding relevant regulatory actions in New York State, including a Commission-directed pilot Distributed Energy Resource (DER) data platform that was implemented recently under the oversight of Staff and the New York State Energy Research and Development Authority (NYSERDA).[4] This whitepaper also considers a recent DER industry group initiative that advocates for rapid development of a centralized data platform containing utility-sourced information that would be useful to DER providers and other stakeholders.[5] The whitepaper then describes and assesses the existing energy information framework in New York State; identifies and characterizes notable energy data initiatives in other states; and, proposes a plan to develop and operate an Integrated Energy Data Resource (IEDR) for New York State.

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1 See generally, Case 14-M-0101, Reforming the Energy Vision.

2 Case 20-M-0082, Strategic Use of Energy Related Data, Order Instituting Proceeding (issued March 19, 2020) (Instituting Order).

3 Instituting Order, p. 7.

4 Case 18-E-0130, In the Matter of Energy Storage Deployment Program, Order Establishing Energy Storage Goal and Deployment Policy (issued December 13, 2018) (Storage Deployment Order).

5 Case 14-M-0101, In the Matter of Distributed System Implementation Plans, Summary Report: Distributed Energy Resource Market Enablement Data Needs (filed as a Public Comment January 6, 2020).

In the most general terms, Staff recommends that the IEDR collect and integrate a large and diverse set of energy-related information on one statewide data platform. The types of information made accessible through the IEDR should provide useful insights related to the provision and use of electricity and natural gas in New York State. To advance development of a statewide IEDR, Staff recommends that the Commission specify the IEDR's purpose, scope, and capabilities, and establish frameworks for funding, program management, and governance.

2 Background

2.1 New York State Regulatory Actions Relevant to Energy-Related Data

The REV Track One Order acknowledged the importance of data availability for the future adoption of DER and customers' management of their energy usage.[6] Acting on this, the REV Track One Order established a policy framework to develop DER markets and advance State clean energy goals. In doing so, the Commission called for a single, uniform platform for retail market access throughout New York that would also serve as a statewide market for REV-enabled products and services.[7] The Commission intended for REV to establish markets so that customers and third parties can be active participants in the new, dynamic energy grid; resulting in a more efficient and secure electric system with better utilization of distribution, bulk generation, and transmission resources. Through this market animation, DERs will become integral tools in the planning, management, and operation of the electric system. Developers will be able to monetize the value of DERs in this market, allowing DERs to compete with more centralized options. Furthermore, customers will be able to create new value opportunities while improving system efficiency by exercising choices within an improved electricity pricing structure.

To enable these markets, the Commission described New York's investor owned electric utilities[8] as transitioning from the historical model of a unidirectional electric system, serving an inelastic demand, to a more dynamic, bidirectional system including a modernized infrastructure, price-reactive loads, and, greatly enhanced capabilities for acquiring,

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[6] Case 14-M-0101, Reforming the Energy Vision, Order Adopting Regulatory Policy Framework and Implementation Plan (issued February 26,2015) (REV Track One Order).

[7] Id., p. 63.

[8] New York's investor-owned electric utilities are: Central Hudson Gas and Electric Corporation (Central Hudson), Consolidated Edison Company of New York, Inc. (Con Edison), New York State Electric & Gas Corporation (NYSEG), Niagara Mohawk Power Corporation d/b/a National Grid (National Grid), Orange and Rockland Utilities, Inc. (O&R), and Rochester Gas & Electric Corporation (RG&E) (collectively, the Joint Utilities). The requirements of the IEDR are applicable to all jurisdictional utilities in New York, including natural gas utilities.

communicating, and managing data. The REV Track One Order deliberated on many issues and options including, but not limited to, stakeholders' needs for different types of data (e.g., system and customer data) to enable markets, data accessibility, cybersecurity, and the creation of an independent data exchange. At the time of the REV Track One Order, many parties suggested, and the Commission agreed, that the idea of a separate data exchange was premature; however, the concept of an independent data exchange remained a longer-term goal to be explored as the grid and markets evolved to fulfill REVs goals.[9]

To guide this transformation of the utility model, the Commission defined a set of functions that a modern utility, which the Commission termed a Distributed System Platform (DSP), should perform. The REV Track One Order required each utility, as a future DSP, to periodically file a comprehensive Distribution System Implementation Plan (DSIP) that includes detailed information about the utility's existing and planned capabilities for providing useful, market-enabling data to customers and third parties.[10]

On April 20, 2016, the Commission issued an order adopted guidance for the organization and contents of the Joint Utilities' DSIPs.[11] The DSIP Guidance Order made clear that useful data is needed to encourage market animation and drive DER penetration. The Commission stated that:

> …barriers to DER entry need to be removed. Addressing the information imbalance that currently exists will help remove such barriers. Today, there is very little information available to DER providers regarding the value of, or cost to, site resources in any particular area of the distribution system, or what type of resources or operational characteristics would have the most value. The system data supplied should bring together the information that DER providers will need to locate resources in areas of the system that will produce the most value. Utilities should work with stakeholders to address the types and levels of data to be provided, the methodology and rules for providing system data (including addressing security concerns), and frequency of updates.[12]

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9 REV Track One Order, p. 58.

10 Id., p. 59.

11 Case 14-M-0101, Order Adopting Distributed System Implementation Plan Guidance (issued April 20, 2016) (DSIP Guidance Order).

12 Id., p. 41.

Staff provided the Joint Utilities with more detailed DSIP guidance in a May 2018 whitepaper,[13] further emphasizing the importance of customer and distribution system data. The DSIP Guidance Whitepaper stated that:

> [m]aintaining a full and timely exchange of DSIP information between the utilities and stakeholders is critical to achieving the most beneficial deployment and use of DERs. Key areas of emphasis should include: the purposeful development of stakeholder tools and information sources useful to DER providers in fostering productive DER development; collecting, managing, and sharing system and customer data; and, advances toward an integrated planning environment.[14]

Since launching REV, the Commission has continued to work on numerous data-related initiatives encompassing both customer and system data access. Nonetheless, DER providers and customers are still unable to efficiently access most of the data that would be useful to them. Without such access, the State will not be able to implement the dynamic, reactive, and efficient distribution system envisioned in REV. This whitepaper proposes next steps to enable access to useful energy data.

2.2 Pilot Data Platform

The Storage Deployment Order directed Staff and NYSERDA to lead coordination efforts with the Joint Utilities, Long Island Power Authority (LIPA), New York Power Authority (NYPA), and other stakeholders to develop and implement a Pilot Data Platform (Pilot Data Platform) with the assistance of a third party platform provider.[15] The Energy Storage Order highlighted the need to acquire, organize, and enable developer queries of the interrelated customer and electric system data in ways that help them more efficiently identify storage and/or DER development opportunities that best fit their objectives.[16] The Energy Storage Order also emphasized the need for masking and other security measures to protect customer and electric system data from unauthorized access. The Commission established the goal of implementing an operational platform by December 31, 2019 and suggested exploring the possibility of using the NYPA New York Energy Manager (NYEM) or another available resource to accelerate the initial development of the platform.[17]

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[13] Case 16-M-0411, DPS Staff Whitepaper, Guidance for 2018 DSIP Updates (issued May 29,2018) (DSIP Guidance Whitepaper).

[14] Id., p. 5.

[15] Case 18-E-0130, Storage Deployment Order, Ordering Clause No. 12.

[16] Id., p. 85.

[17] Id., p. 84.

NYSERDA and Staff initiated the project by first defining the Pilot Data Platform's functional objectives and then establishing the scope of work. Those initial efforts determined that the Pilot Data Platform, its associated operating processes, and its associated interactions with users and data sources shall provide the means and methods to:

- enable complex, developer-designed, select queries across all categories of customer and system data stored in the database;
- prevent unauthorized identification of customers;
- prevent unauthorized identification of system elements;
- comply with appropriate cybersecurity protections, such as potential Data Security Agreements;
- enable automatic consent requests or data transfers if consent was previously received; and,
- allow for the evolution of data sets within the platform, including updating data over time, adding categories of data, and reformatting data masking protocols if needed.

Staff and NYSERDA then met with NYPA in February of 2019 and mutually determined that it would not be practical to use the NYEM as the Pilot Data Platform. However, Staff and NYSERDA suggest that consideration could be given to NYEM in the future for broader platform rollout.

To select an investor-owned electric utility for participation in the Pilot Data Platform, Staff and NYSERDA determined that the participating utility must: currently collect and store many/most of the desired data types identified below; serve an area with active DER development; have the necessary Information Technology (IT) capabilities in place; and be willing to process and transfer the required data sets. Based on those criteria, Staff and NYSERDA selected Orange and Rockland Utilities (O&R) to be the participating Pilot Data Platform utility. O&R has many of the necessary participating utility qualities, such as: they operate in a downstate New York Independent System Operator, Inc. (NYISO) zone where energy storage and other DERs have more value; they have deployed advanced metering infrastructure (AMI) so have more interval data; and, they serve an area with diverse demographics.

Informed by the insights gained through extensive developer interactions during development of the Energy Storage Roadmap,[18] NYSERDA and Staff determined that the types of interrelated customer and system data useful to DER developers would include details related to (but not be limited to) substations, circuits, service points (electric and gas), customers (electric and gas), buildings, DERs, and electric vehicles (EVs). A detailed breakdown

[18] Case 18-E-0130, New York State Energy Storage Roadmap and Department of Public Service / New York State Energy Research and Development Authority Staff Recommendations, (filed June 21, 2018) (Energy Storage Roadmap).

of the data items within these categories (as well as several other categories recommended for the IEDR) is provided in Appendix B.

O&R and the selected third party contractor, Trove Predictive Data Science (Trove), jointly determined the Pilot Data Platform's initial dataset, which was limited to a subset of the above items to reduce complexity and streamline development and testing. DER developers were called on for input throughout the process, as well as to test and evaluate the functionality and usefulness of the Pilot Data Platform's capabilities.

Development and rollout of the initial Pilot Data Platform was successfully completed on-time and at a cost of approximately two hundred and forty thousand dollars. DER industry members were subsequently invited to: register as Pilot Data Platform users; test the Pilot Data Platform's functions and features; share details about their user experiences; provide their assessments of the Pilot Data Platform's usefulness as a resource for identifying opportunities to deploy and/or operate DERs; and, suggest changes and/or additions that would enhance the Pilot Data Platform's value to them. At the time of filing this whitepaper, more than 24 DER developers have registered as users and begun testing the Pilot Data Platform. Aside from identifying a few minor glitches – which were readily resolved – the user comments received so far have been very positive.

The Pilot Data Platform is performing as anticipated and Staff suggests that further development of the resource will be useful and informative. Staff is encouraged by O&R's participation and by Trove's capabilities and expertise. Full-scale implementation of a resource that expands on the scope and functionality of the Pilot Data Platform has the potential to be a ground-breaking tool for the DER market and the clean energy industry.

2.3 DER Industry Data Initiative

In March 2019, a group of DER industry members and consultants (the DER Industry Group) commenced an effort to examine and report on the role of data in animating the markets for DER products and services envisioned in REV. The group periodically received input from Staff and NYSERDA in an effort to maintain alignment with current and future State policies and programs.

Purpose of the DER Industry Group Report

The DER Industry Group's report[19] focuses primarily on the industry's need for grid, market, and customer information from utilities; the shortcomings of the existing collection of disparate utility information sources available to industry stakeholders; the composition and benefits of a minimum viable data set (MVDS) comprising the most basic set of utility-sourced information needed to accelerate DER market animation; and, the advantages and

[19] Case 16-M-0411, Summary Report: Distributed Energy Resource Market Enablement Data Needs (filed in the public comments section on January 6, 2020).

characteristics of a centralized and highly standardized data platform populated first with the MVDS and then with additional types of information useful to the DER industry and other stakeholders.

To make clear the value of their recommendations, the DER Industry Group report describes a variety of information use cases that would help DER industry members to identify DER development opportunities and plan DER solutions that are well-aligned with their capabilities and business objectives. The use cases described in the report seek to identify and characterize opportunities based on utility customer needs and interests, grid needs identified independently by developers, and utility-identified grid modernization needs. Through their evaluations of those use cases, the industry group identified and characterized the MVDS data elements needed to enable efficient and effective implementation of those use cases by the market participants. All of the DER Industry Group's recommended MVDS data elements are included in Staff's recommended set of IEDR data items listed in Appendix B.

The anticipated benefits of the centralized and highly standardized data platform advocated for in the report include improved information visibility and integrity resulting in greater confidence in statewide system planning, policy development, and regulatory proceedings. The recommended approach will also streamline customer and third party engagement through data analytics and improve industry members' ability to create and implement new markets.

The Minimum Viable Data Set (MVDS)

The DER Industry Group's report identifies three categories of data needed to enable the key DER developer use cases: grid condition and performance data; business case and market data; and, customer data.[20] According to the DER Industry Group, having enough data in each of these categories would materially improve DER providers' ability to identify locations where DERs can provide the most value to customers and/or the grid. Furthermore, the industry group explains that the MVDS proposed in the report would improve DER providers' ability to accurately calculate and optimize business cases for DER investments that maximize value to investors and customers. The report summarized the MVDS in the following table:

Figure 1: MVDS Data Categories and Elements

[20] Id., p. 7.

Grid Condition/Performance Data	Business Case/Market Data	Customer Data
System Elements	Distribution Network Value – Tariff	Customer Class
Hosting Capacity Analysis	Distribution Network Value – Non-Wires Solution	Tariff
Network Demand	Bulk Power Market Value	Bill
Voltage & Power Quality	Distribution Investment Plan	Interval Usage
Reliability Statistics	Other	Location

To maximize the usefulness of the MVDS to market participants, the industry group report notes that the meaning, format, attributes, and integrity of data elements from across New York State should fully comply with standard specifications that are compatible with applicable national standards or practices. The report further notes that the timely updating of all data elements, based on the requirements of the MVDS use cases, is necessary to ensure MVDS usefulness.[21]

The DER Industry Group found that most of their recommended MVDS data elements are available and accessible in today's data environment, but that a DER developer must acquire needed data from disparate sources. According to the DER Industry Group, the significant differences in the meaning, format, attributes, and integrity of their respective data is an inconsistency that presents a barrier to DER market animation as it severely hinders DER developers' ability to effectively and efficiently use the data that they obtain from those sources. The following table from the report summarizes the industry group's assessment of current MVDS data availability:

Figure 2: Current Availability of Recommended MVDS Data Elements

[21] Id., p. 10.

Grid Condition & Performance Data	Status	Business Case & Market Data	Status	Customer Data	Status
System Elements	✓	Distribution Network Value – Tariff	✓	Customer Class	✓
Hosting Capacity Analysis	✓*	Distribution Network Value – Non-Wires Solution	✓	Tariff	✓
Network Demand	✓*	Bulk Power Market Value	✓	Bill	✓
Voltage & Power Quality	✓*	Distribution Investment Plan	✓	Interval Usage	✓*
Reliability Statistics	✓	Other	✓	Location	✓

✓ Available ✓ Partially Available ✗ Not Available * Improved/Available w/ AMI

The industry group report argues that the current "federated" data environment in New York State is not fulfilling the REV objectives for providing DER developers and other stakeholders with data that enable DER market animation.[22] Participants in the initiative reported that the structure and contents of today's data ecosystem are primarily utility-oriented rather than market-focused. They further describe a "…disjointed and opaque data environment"[23] in which data are often hidden behind multiple layers of access; are encoded, stored, and presented with inconsistent characteristics (even within a single utility); and, are updated too slowly and/or irregularly.

To resolve the shortcomings of the current data environment, the DER Industry Group recommends combining all MVDS data elements into a centralized platform from which DER developers and other stakeholders can acquire data that are uniform, current, and accurate. According to the DER Industry Group, such a platform would enable efficient and effective holistic data analyses that are very difficult to perform using the current environment.

Finally, the DER Industry Group recognized the burden associated with creating a centralized data platform and noted that there is no mechanism for the Joint Utilities and the market to transition from the current decentralized environment to a centralized framework. The report further notes that the new platform should align with and incorporate the results of any ongoing relevant data access efforts in the State, such as the Pilot Data Platform described earlier in this whitepaper.

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[22] Id., p. 26.

[23] Id., p. 13.

3 The Current State of Access to New York State Energy Information

When REV was initiated in 2014, the grid and the business operations of the Joint Utilities provided one-way distribution of electrical energy produced mostly by large, centralized generating plants. There were few provisions (if any) in this traditional operating model for efficiently planning, interconnecting, and operating large numbers of widely distributed DERs. Any sharing of the utility system and customer data with non-utility entities was minimal, at best.

To enable REV's objectives, the Commission ordered the Joint Utilities to implement a new operating model that, among other things, provides DER developers, energy consumers, and other grid stakeholders with efficient access to a wide variety of useful grid and market information. Based on the Commission's instructions[24] and guidance from DPS Staff,[25] the biennial DSIP filings describe the Joint Utilities' current status and plans for timely and efficient sharing of useful data. Unfortunately, the data sharing achievements and plans reported in the DSIPs, and the progress observed by stakeholders and Staff, have fallen well short of the Commission's directives.

3.1 Existing Energy Data Resources

While useful access to useful energy data has not yet been achieved, the variety and volume of system and customer data now available from the Joint Utilities and other providers has increased when compared with the minimal amount of data available in 2014. The following subsections describe the data resources currently available to DER developers, energy consumers, and other grid stakeholders.

3.1.1 Utility System Information Portals

Since 2016, each of the Joint Utilities has separately implemented, enhanced, expanded, and maintained one or more online portals for sharing useful electric system information with DER developers and other industry stakeholders. The types and attributes of shared information, and the methods for sharing the information, have been both prescribed directly by the Commission and determined through a Commission-directed stakeholder engagement process that is led by the Joint Utilities. Following are the categories of system information currently available online for each utility:

- Distributed System Implementation Plans (via the DPS DMM platform)
- Capital Investment Plans (via the JU web site or the DPS DMM)
- Planned Resiliency/Reliability Projects (via the JU web site or the DPS DMM)
- System Reliability Statistics (via the utility's web sites or the DPS DMM)
- Hosting Capacity (via the utilities' web sites)

[24] Case 14-M-0101, DSIP Guidance Order.

[25] Case 16-M-0411, DSIP Guidance Whitepaper.

- Beneficial Locations for DERs (via the utility or JU web site, the DPS DMM, or none)
- System Load Forecasts (via the utility web sites, or none)
- Historical System Load Data (via the utility web sites, or none)
- Opportunities for Non-Wires Alternatives (via the utility web sites, or none)
- Distributed Generation Queued for Interconnection (via the DPS public web site)
- Installed Distributed Generation (via the DPS public web site)
- System Interconnection Request (SIR) Pre-Application Info (via the utility web sites)

Web links to all the utilities' online system information sources are publicly accessible via the System Data page of the Joint Utilities of New York web site.[26] A consolidated inventory of those links is provided in Appendix A.

Currently, the structure, attributes, semantics, availability, and accessibility of the information from many of these sources vary significantly across the utilities. In addition, these sources provide little of the information related to EV loads and energy storage that was specified in Staff's 2018 DSIP Guidance. Finally, and very importantly, only the few sources pertaining to DER interconnections provide any sort of association between a utility customer and the system infrastructure that serves that customer.

3.1.2 Utility Customer Data Portals

Along with requiring the Joint Utilities to share useful system information, the Commission's REV Orders sought to ensure that the Joint Utilities implement means and methods for providing useful customer-specific information to DER developers and other grid stakeholders. Those means and methods for providing useful data are required to include adequate provisions for protecting customers' personally identifiable information (PII) and for obtaining customer consent to allow third party access to any of that information. As the amount of data generated by the grid and ratepayers has increased, the use and ownership of that data has become the subject of debate and numerous regulatory actions nationwide. The Commission has provided guidance that this data is owned by ratepayers, not ratepayer-funded utilities, and it is a priority to protect ratepayers' rights regarding this data.[27]

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[26] Available at: https://jointutilitiesofny.org/system-data/.

[27] Case 18-M-0376, Proceeding on Motion of the Commission Regarding Cyber Security Protocols and Protections in the Energy Market Place, Order Establishing Minimum Cybersecurity and Privacy Protections and Making Other Findings (issued October 17, 2019), pp. 13, 47.

Detailed time-series interval data describing customer energy consumption is particularly useful for several purposes. Other types of useful customer-specific information envisioned for sharing include (but are not limited to) customer category, service address, service voltage, service configuration, billing rate, meter type(s), NYISO zone, NYISO transmission node, substation, substation transformer ID, distribution circuit, circuit phase(s), distribution transformer ID, local hosting capacity, DER details, EV charging details, applicable NAICS code, building characteristics, municipality, and applicable zoning.

Thus far, the Commission's emphasis and Joint Utility efforts have focused on providing the data that describe each customer's energy consumption and promoting more efficient and productive access to those data by DER developers and other grid stakeholders. To advance progress towards that goal, the Commission directed[28] the Joint Utilities to implement highly standardized online customer data sources based on, or equivalent to, the Green Button Connect (GBC) standard.

GBC is a format, access, and interface standard for energy consumption data that provides energy customers (electric and gas) and authorized third partieswith access to the customers' energy usage data. Energy data providers that comply with the GBC standard uniformly provide user-friendly and computer-friendly data access that is consistent from one provider to the next. Widespread GBC implementation by energy utilities should enable third party energy product and service providers to significantly increase the speed and efficiency of their marketing, sales, and operations.

Importantly, a utility's ability to timely provide detailed energy usage data for customers (both electric and gas) is contingent on the utility's use of smart meters at the customers' premises. Timely acquisition of data from those smart meters requires AMI. Currently, just two of the Joint Utilities, Con Edison and O&R, have widely – but not yet fully – deployed AMI in their service territories. National Grid, NYSEG, and RG&E are at varying stages of planning, funding, and initiating AMI deployment. Meanwhile, Central Hudson has decided not to deploy smart metering widely in its service territory.

To date, only Con Edison and O&R have implemented GBC. On October 15, 2019, the Joint Utilities filed a Status Report on Green Button Connect My Data with the Commission.[29] The JU summarized the status of GBC in New York is as follows:

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[28] Case 18-M-0084, In the Matter of a Comprehensive Energy Efficiency Initiative, Order Adopting Accelerated Energy Efficiency Targets (Issued December 13, 2018) (Accelerated EE Order).

[29] Case 18-M-0376, Proceeding on Motion of the Commission Regarding Cyber Security Protocols and Protections in the Energy Market Place, Joint Utilities Report on Green Button Connect My Data (filed October 15, 2019).

- Con Edison and O&R have implemented GBC in a manner that does not fully comply with the GBC standard. Only three third parties have completed the registration process and are permitted to receive customer consent to acquire customer data. An additional ten third parties are in various stages of the registration process.
- Central Hudson does not offer GBC but offers Green Button Download My Data.
- National Grid is currently planning to implement GBC for its electric and gas customers by March 31, 2021. National Grid may deliver these services ahead of this date, if possible, and cost-effective to do so.
- NYSEG allowed customers to use GBC using a third party vendor as part of its Energy Smart Community (ESC) Energy Manager pilot. Customers in the ESC were temporarily able to use GBC to share energy usage data with six (6) approved third party vendors. NYSEG and RG&E's full implementation of GBC as part of their Energy Manager Web Portal is subject to the Commission's approval of the Companies' AMI proposal in their ongoing rate proceeding.[30]

3.1.3 Utility Energy Registry

On April 20, 2018, the Commission issued an Order approving the development and implementation of the Utility Energy Registry (UER).[31] The UER is an online platform developed and maintained by NYSERDA with the support of the State's investor-owned gas ad electric distribution utilities. The UER's primary purpose is to crowdsource sector-wise energy consumption data from utilities in New York's cities, towns, and villages. Municipalities can influence how communities use and produce energy through community choice aggregation (CCA), building codes, policies to promote distributed energy resource (DER) development, and through other strategies. The UER now has a reporting dashboard for analysts to report data online that will be instantly available to the public. The UER, as authorized in the UER Order, was intended to be a starting point that would require continuing Commission oversight and refinement with expected changes and evolution over time.

On December 30, 2019, NYSERDA filed a UER Status Report (Report) prepared by Climate Action Associates, LLC to report on the progress of the UER's implementation and operation, including the demand for, uses of, and benefits of UER data, as well as the need for

[30] Case 19-E-0378 et al., New York State Electric & Gas Corporation- Rates.

[31] Case 17-M-0315, In the Matter of the Utility Energy Registry, Order Adopting Utility Energy Registry, (issued April 20, 2018) (UER Order).

refinements.[32] The Commission is expected to prescribe changes to the UER's implementation and operation within the next year to optimize the online platform's value and worth.

3.1.4 REV Connect

In August 2017, NYSERDA launched REV Connect,[33] a centrally managed online portal with a team of experts who oversee its maintenance and evaluate idea submissions. The purpose of REV Connect is to facilitate productive relationships between energy innovators the Joint Utilities. REV Connect invites companies to connect with the Joint Utilities to accelerate innovative demonstration projects, technologies, and business models that advance New York's REV goals. The REV Connect team comprises a cross-section of subject matter experts whose backgrounds span the energy value chain. The principal partners behind REV Connect are NYSERDA, New York Battery and Energy Storage Technology Consortium (NY-BEST), Navigant Consulting, Inc., and Modern Grid Partners.

The REV Connect portal is meant to serve as a central channel that energy innovators can use to submit ideas that could potentially further the opportunities created by REV. A company that submits an idea through REV Connect receives streamlined evaluation, expert feedback, and, if successful, pairing with one of New York's utilities and other potential market partners.

To promote better targeting of proposed innovations, the portal provides its users with useful data and information resources that describe each utility's priority business needs, service territory, and REV-related initiatives. Opportunities for innovation are organized both by topic and by utility. The portal also provides links to detailed information about non-wires alternative (NWA) opportunities at each utility.

3.1.5 NYSERDA DER Integrated Data System

The DER Integrated Data System is a web site,[34] implemented and run by NYSERDA, which provides information on DERs installed in New York State. The DERs cataloged on the site include photovoltaic solar arrays, energy storage systems, combined heat and power (CHP) systems, fuel cells, anaerobic digesters, and controllable loads that are connected to a utility customer within an electricity distribution system. Many of those DERs received financial incentives from the State and report their performance data to NYSERDA. Utility customers who own or host DERs can include commercial, industrial, institutional, and multifamily facilities as well as single-family residences.

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[32] Case 17-M-0315, supra, NYSERDA UER Status Report (filed December 30, 2019).

[33] See, https://nyrevconnect.com/.

[34] See, https://der.nyserda.ny.gov/.

The web site can be used to learn about DER technologies, explore where DER projects are located across NYS, and investigate DER performance (either individually or in user-defined groups). The site includes an interactive map of New York State that enables targeted searches of DER locations based on technology and provides single-click access to detailed information about each DER shown on the map. Performance data provided on this web site tracks daily real-world performance data from over 700 active DERs. Characteristic data is provided for DERs that have been accepted into any of the NYSERDA DER incentive programs that require performance monitoring or that have voluntarily provided information to NYSERDA. All characteristic data on the web site is downloadable in a single file (.xls format).

3.1.6 Building Energy Benchmarking

In the Accelerated Energy Efficiency Order, the Commission found that aggregated whole-building energy data is a crucial market enabling mechanism that can promote uptake of energy efficiency measures by building owners. As an example, the Accelerated EE Order cites New York City's Local Law 84, which requires New York City utilities (Con Edison and National Grid) to electronically provide aggregated metered consumption data for all-electric and gas accounts in any building. The law also requires that monthly whole-building aggregated data be uploaded through the EPA Energy Star Portfolio Manager, for qualifying size buildings.[35] In addition, the Commission noted that the Joint Utilities should plan for future New York State legislation mandating a similar framework for statewide building energy benchmarking.

The Accelerated EE Order requires the Joint Utilities to provide to a building owner, upon the owner's request, aggregated whole-building electric and gas meter data for any given building or tax lot for use in benchmarking through the Energy Star Portfolio Manager.[36] In addition, the Commission established rules to protect against the unauthorized determination of an individual building tenant's energy use, which govern the availability of the data to the building owner. The Accelerated EE Order also requires the utilities to develop the capability for the automated upload of aggregated data, and along with NYSERDA, develop a programmatic offering which utilizes benchmarking data to be marketed to decision-makers of suitable building types.[37]

As of 2019, only Con Edison and National Grid have implemented capabilities for automatically uploading monthly aggregated whole-building energy consumption data; however, this is significant in that their respective service territories contain roughly half of the multi-tenant buildings in New York State. NYSEG, RG&E, and Central Hudson have each begun the system integration needed to enable automated upload capabilities within the next two

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35 New York City Local Law 84 of 2009.

36 Accelerated EE Order, p. 46.

37 Id.

years. O&R and National Fuel Gas Distribution Corporation have not yet started developing automated upload capabilities but are expected to begin soon.

3.2 Assessment of Current Energy Data Resources

This section assesses New York's current portfolio of available energy data and accessible energy data resources with respect to availability, accessibility, and usefulness. The overall conclusion that can be formed from these assessments is that for most of the State's energy stakeholders, the current energy data landscape is inadequate and inefficient. Staff's proposed IEDR provides a comprehensive and coherent vision to move beyond the serious shortcomings of the current landscape and provide energy stakeholders with useful access to useful energy-related information and tools in the most efficient manner that will accelerate progress toward achieving the State's energy and climate goals.

3.2.1 Availability

Information can be made available for useful access only if it exists in the first place. Fortunately, several types of system, market, and customer information that are useful to energy stakeholders currently exist at the utilities and other organizations, in one form or another. Examples of useful information generally existing at the State's electric and gas distribution utilities include system topology, system asset data, reliability statistics, DER interconnection data, NWA procurement opportunities, distribution investment plans, distribution tariffs, bulk power market zones and values, customer classes, customer rates, customer energy consumption, customer bills, meter asset data, service configurations, and service locations. Useful information available from various non-utility sources includes demographic data, economic statistics, building characteristics, zoning, tax rules and rates, weather data, environmental data, and transportation data.

On the other hand, due to technical and/or business constraints and decisions that vary by organization, several other types of system, market, and customer information useful to the State's energy stakeholders are available only partially, if at all. Examples of inadequate information availability include: (1) no detailed consumption data for more than half of the State's electricity and natural gas consumers; (2) limited market and consumption data for other combustible fuels such as heating oil, propane, kerosene, gasoline, diesel fuel, wood pellets, and firewood; (3) little or no load and performance data for many of the distribution systems that serve the State's rural areas; (4) available hosting capacity data applies only to solar sources, lacks adequate temporal and locational granularity, is updated too slowly, and does not forecast future conditions; and (5) little or no load, performance, and forecast data for EVs and charging resources.

While many types of information are available for all parts of New York State, the scope and variety of information available at any one organization generally serves the purposes of that organization only. For example, any given utility will have only the information that applies to its respective plans, operations, and markets. Consequently, to compile a usable statewide

information set, stakeholders must collect, validate, normalize, and combine information provided piecemeal from multiple organizations. This is a major obstacle for the many stakeholders who do not have enough resources to support the effort.

Relational information that identifies and characterizes the relationships between different individual information elements is a foundational resource that enables useful analyses based on those relationships. In the New York's current information environment, such information generally exists only to the extent that it serves the purposes of the organizations that maintain and use those related information elements. For example, relational information generally exists for the relationships between customer accounts and energy consumption data, between customer accounts and service points, and between service points and distribution assets. Importantly, much of the relational information existing at the various organizations is also useful to multiple stakeholder categories.

Meanwhile, other relational information that would be valued highly by many energy stakeholders does not yet exist for many types of information. In particular, relational information generally does not exist for the relationships between the information elements available from the utilities and the many useful information elements that are available from non-utility sources. For example, there is very little relational information that identifies and describes the relationships between utility customers and the various non-utility attributes of their respective service locations (i.e., demographic data, economic statistics, building characteristics, zoning category, tax district, tax rules and rates, local weather data, local environmental data, flood zoning, and transportation data). This all means that individual stakeholder organizations that would benefit from understanding the relationships among various information elements must develop and maintain useful relational information on their own – a significant challenge for most stakeholders.

3.2.2 Accessibility

To be useful to energy stakeholders, available energy-related information must be accessible. Furthermore, productive stakeholder access to that information requires means and methods for access that are practical and efficient. The current state of New York State's energy information resources described above, clearly does not provide stakeholders with practical and efficient access to the information they need.

From the stakeholders' viewpoint, the multiple pathways currently provided for information access comprise a fragmented and disjointed access framework that is hard to understand, highly impractical, and very inefficient. For many important types of information, compiling a regional or statewide data set requires a stakeholder to separately access several (up to six, or more) organization-specific data portals, each with distinct characteristics (i.e., structure, semantics, formats, procedures, functions, etc.) that the stakeholder must understand in order to access the desired information successfully.

In addition, with the utilities and other organizations each providing multiple, information-specific paths for information access, a stakeholder compiling a combined set of information comprising multiple information types must access multiple information sources, each with its own distinct characteristics, even when the information all comes from just one organization. For example, to compile a set of utility-specific information that combines and relates customer service locations with locational hosting capacity data, a stakeholder must separately access, understand, and combine at least two distinct information sources.

3.2.3 Usefulness

Staff finds that the energy information resources currently available do not readily provide the State's energy stakeholders with useful access to useful energy-related information. This lack of usefulness substantially hinders stakeholders' ability to timely develop and implement plans that advance progress towards achieving the State's REV and Climate Leadership and Community Protection Act (CLCPA) objectives.[38] The current insufficiency stems from multiple characteristics of both the information framework and the information itself.

Key information characteristics discussed in the two previous sections, availability and accessibility, are fundamental prerequisites to usefulness – information that cannot be obtained cannot be used. While an increased amount of information is already available and accessible in today's environment, the usefulness of that information is diminished because some types of information are only partially available or do not exist at all, and, because acquiring a complete set of information needed for a given purpose frequently requires accessing and using several dissimilar information sources that are separately governed and maintained by several distinct entities.

The usefulness of both the framework and the information is also materially affected by the scope and variety of functions enabled within the environment. Unfortunately, the functions enabled in the current environment lack both the scope and variety needed by the New York's energy stakeholders. This is largely due to the fragmented, decentralized, compartmented, and multi-source structure of the current framework. Generally, a function operating within any one of the many resources (filtering, for example) is limited to the scope of information available within the individual resource. To apply that same function to information acquired from multiple resources requires the stakeholder to either run the function separately in each of those resources (assuming the same function exists in each) or independently implement and apply the function after the necessary information set is acquired separately from each resource. Meanwhile, the variety of functions available in the current environment is limited to a small collection of simple, single-stage, single-use, structural operations (i.e., searching, filtering, linking, viewing, and downloading) and thus does not enable stakeholders to create, save, and run the kinds of repeatable, multi-stage, multi-

[38] 2019 N.Y. Ch. 106.

parameter, structural, logical, and mathematical operations that would efficiently generate more useful information.

Another particularly important factor affecting the usefulness of an information environment is the degree to which there is useful relational information that describes the relationships among the various information elements throughout the environment. As noted above in section 3.2.1 on Availability, there is an acute lack of integrated relational information in the current information environment, both for information within a single resource and information spanning multiple resources. This dearth of relational information seriously hampers stakeholders' ability to find, analyze, and generate useful information. For example, stakeholders cannot use the current environment to identify energy consumers who are served concurrently by two separate and unaffiliated energy suppliers.

Any one of several information attributes - granularity, precision, accuracy, age, and uniformity – can either increase or decrease the information's usefulness. To be sufficiently useful in a given use case, one or more attributes of an information element must meet or exceed a minimum level of adequacy. For example, to enable many use cases that employ time-series interval data for energy usage, the length of the time intervals (the temporal granularity) must be no greater than one hour. Daily or monthly intervals would be of little or no use. In today's environment, such temporally granular usage data is not available for a large number of utility customers due to the gradual rollout of smart metering statewide.

Similarly, some potential use cases require data that meet minimum thresholds for precision and accuracy. For example, a use case could require time data that is precise to the second and accurate to one-tenth of a second. Information that does not satisfy the precision or accuracy requirement could materially reduce the validity of use case results. To provide local grid services, a DER provider needs information about the surrounding grid that accurately describes true grid conditions. The data must also be precise enough to enable useful analyses that inform DER providers' investment and operating decisions. In today's data environment, stakeholders have almost no visibility into distribution-level system conditions, outside of periodic updates of hosting capacity maps, NWA RFPs, and the limited updates in the utilities' DSIPs.

Furthermore, each potential use case has a maximum age (or latency) for each information element used. For example, hosting capacity data for a distribution circuit could be of little or no use to a DER developer if it is more than a few months old. This can be particularly challenging in today's environment, as the DSIPs are only filed biennially, which can leave the data contained within the DSIPs quite stale. Meanwhile, the data available from other utility sources are irregularly updated at different, uncoordinated times that are often too late for the purposes of many possible use cases, further increasing the complexity of and decreasing the usefulness of stakeholder's' analyses.

Finally, the usefulness of an information environment depends greatly on the uniformity of the structures, interfaces, and information elements within that environment. The Joint Utilities have done a lot of work to increase the consistency of the data provided in their DSIPs and elsewhere. Nonetheless, in the multi-source environment currently provided by the utilities, the organization and attributes of data elements often vary significantly from one source to the next. For example, different utilities use different approaches for calculating their system capacity factors and they often change the capacity factor for a given location without disclosing their basis for making the change. This sort of inconsistency greatly increases the complexity and difficulty of stakeholders' efforts to validate and combine data for holistic analyses.

4 Notable Energy Data Initiatives in Other States

New York is one of several states that are conducting initiatives to increase the accessibility and usefulness of energy-related data available from their utilities and other sources. The following sections provide summaries of several notable data initiatives in other States that have informed Staff's recommendations.

California

The California Public Utilities Commission (CPUC) has recognized the need for accessible, higher quality, and standardized data to encourage the market for DERs. In an order issued on September 23, 2013, the CPUC authorized utilities to provide customer data to third parties when requested by the customer. This allows utilities to provide customer energy usage data to third parties in a secure way that protects both ratepayers' privacy and utilities from liability. To further protect ratepayer's privacy, it also requires that third parties be pre-approved by the utility as a trusted vendor. This allows DER providers marketing in the State to target interested consumers and tailor their offers to the specific customer by requesting their energy usage data from the customer, receive it from the utility, and then use that data to tailor their offers to the specific customer, increasing the value of potential products and maximizing the value derived from these DERs.

CPUC continued to make data access a priority and in an order issued on May 5th, 2014, the CPUC adopted rules that provided access to aggregated energy usage and other related data to local government entities, researchers, and state and federal agencies. The CPUC instructed utilities to release the total monthly sum and average of customer electricity and natural gas usage by zip code and customer class quarterly. The CPUC order also defined the process through which entities could request this data and formed the Energy Data Access Committee (EDAC) to advise the utilities on how data access could be improved, identify best practices, and mediate disputes between data requestors and the utilities. This data is vital for many research efforts, long-term system planning, and local benchmarking efforts.

CPUC was also aware that for data to be useful, it would have to be readily available in a standardized format. Consequently, the data described above is mandated to be made available in standard data formats, at least one of which must be a standard machine-readable format, like CSV or XLS. For data transfers, GBC is used as the communication standard utilities and third parties can design around. This prevents utilities from using proprietary or esoteric formats, reducing the value of the data or raising its cost through more processing or having to pay the utility to offer the data in a more accessible format.

Illinois

Like other states, Illinois has also prioritized the availability of retail usage data through GBC and usage portals to encode and transfer ratepayers' energy usage data to third parties. For this purpose, the Illinois Commerce Commission (ICC, the entity responsible for regulating public utilities in Illinois) created the Data Access and Retrieval Tenets (DART) tariff for Commonwealth Edison (ComEd). The DART tariff enables third parties' access to ComEd residential usage data. The data is in a standardized AMI interval data format and is transferred by ComEd through its Retail Electric Supplier (RES) portal and GBC. Third parties must receive prior approval from the retail customer whose data is requested, and the third party must set up and certify that its system meets the requirements to hold the data securely. All data acquired through the DART tariff is considered confidential and any use for commercial purposes not reasonably related to the conduct of the Company's business (such as the sale of data or the analysis of the data) is prohibited.

The two methods of receiving customer usage data from ComEd, the RES portal and GBC, vary in the setup required and how often information can be requested and received. Third parties do not require an extensive setup for the RES portal, and these portals are typically accessed through standard web browsers. However, requests from the RES portal are limited to once per month per customer, along with access to the previous consecutive twenty-four billing periods. This means that the RES portal is useful for DER providers that require current and historical data to tailor their offerings to customers but do not require ongoing or frequent access to their existing customers' data. Access through the GBC API is more advanced and allows access to the same historical data as the RES portal but can also be refreshed daily through the GBC API. This type of access is more useful for third parties who provide smart products and demand response resources that rely on current data.

New Hampshire

New Hampshire bill SB284, passed and effective on September 17, 2019, and supported by legislators and the New Hampshire Office of Consumer Advocacy (OCA), mandated the New Hampshire Public Utilities Commission (PUC) to open docket DE 19-197 for all New Hampshire electric and gas companies. This docket aims to address data access and privacy issues. The bill established the goal of a statewide online energy data platform to provide information about energy use to ratepayers, third parties, and investor-owned utilities (IOUs). The envisioned

platform aims to provide access to granular energy data to empower consumers to actively manage their data usage and drive third party innovation. This data platform will contain aggregated data at the neighborhood, municipality, and regional levels. The legislature expects that the aggregated data will also be particularly useful for municipalities interested in introducing municipal aggregation programs.

The effort in New Hampshire is in its infancy, with the first prehearing conference held on February 3, 2020, and PUC Staff requested scoping comments on February 10, 2020. The conference was well-attended, and numerous stakeholders have provided comments, including the State's Office of Consumer Advocacy, Mission:data, the City of Lebanon, and the Joint Utilities. As a major partner in the effort, the OCA has defined six "core" use case datasets for the platform and its accompanying API, whose purpose is to enable a variety of business use cases such as access to green button connect and improved analytics for EE programs.

The six core use case datasets identified by the OCA are billing, TOU, demand study, multi-state and utility, multi-fuel, and a Statewide index, the last dataset referring to the idea that the SB284 platform will act as a single source of truth for all electricity and other fuel information in the State. These data will facilitate third party billing (for ESCOs and IOUs), the expansion of demand studies, and encourage CCA adoption by aiding municipalities in their CCA efforts. To support this broad range of use cases and future use cases that have yet to be defined, the SB284 data platform will be built with database extendibility in mind and the ability to have independent, topic-limited frontends that have varying levels of access as needed for each use case. DPS Staff is monitoring this proceeding closely to ensure that the State will be able to exchange lessons learned to encourage the adoption of these platforms in both States.

Texas

The transmission and distribution service providers (TDSPs) in Texas jointly own and operate Smart Meter Texas (SMT), a web portal and data repository that receives and stores smart meter data, going back up to seven years, for more than 7.3 million residential and small business customers. The portal enables customers to access their energy usage data for their own use and share their data with the competitive energy service providers that vie for customers in the state's deregulated energy market

Several times every day, the TDSPs collect a daily midnight register read and the previous day's recorded interval usage data from the smart meters they own. This data is transmitted from the smart meters back to the TDSPs using the TDSP meter communications networks (wired and wireless) designed for this purpose. The TDSPs store the meter usage data in their meter data management systems and perform a standard validation, editing, and estimation process on the data before preparing standard formatted files for transmittal to SMT and the Electric Reliability Council of Texas. Once the data is received and stored in the SMT, it becomes available to third parties to request. As with implementations existing or

planned in other States, third parties requesting data from the SMT must first receive permission from the customers in question before any data are shared. The SMT provides a method for customers to grant third parties access to their usage data and In-Home Devices, including using the standardized GBC format.

5 The Path Ahead

As described above, the Commission has identified the need for useful access to useful energy-related data to enable achievement of the State's energy policy goals established in various Commission orders since the REV Track One Order. Based on Staff's review of the current status of those various data initiatives, there is currently a clear gap between what the Commission envisioned and what has been achieved to date. This gap was validated by the DER industry data initiative which demonstrated a market need, that if met, could unlock many useful business cases. Those market needs have become more urgent with the recent adoption of the CLCPA. The overarching impact of the CLCPA goals on various aspects of the New York economy - including electric utilities, natural gas utilities, buildings and transportation - make it imperative that the State's energy stakeholders have useful access to useful energy-related information. Staff finds that an IEDR is the least costly and most efficient way to enable such access to energy-related information acquired from the State's energy utilities (both electric and gas) and other sources.

This section describes a proposal for planning, designing, implementing, operating and maintaining the IEDR within a governance framework that ensures success through best practices. In the most general terms, the IEDR should collect, integrate, and make useful a large and diverse set of energy-related information on one statewide data platform. The types of information and tools made accessible through the IEDR should materially improve stakeholders' ability to understand and affect the provision and use of electricity and natural gas in New York State. The proposed IEDR is a sophisticated information system capable of: automatically and securely acquiring a large volume and wide variety of information from many sources; normalizing, managing and securing large amounts of diverse data; analyzing the acquired information to generate other useful information; applying advanced information controls to manage users' access to functions and data; timely performing extensive, user-defined data analyses; timely and securely exporting data to users and other systems; and, efficiently supporting rigorous system administration, security, and operating processes.

From the beginning, the IEDR's contents and capabilities should evolve in a sequence that closely aligns with use case priorities that are determined on the basis of stakeholder value, feasibility, and advancement toward the State's energy policy goals. At a minimum, the

data elements initially implemented in the IEDR should comprise a data set that includes the MVDS.[39]

To advance development of a statewide IEDR, the Commission should begin with an order specifying the IEDR's purpose, scope, capabilities and establishing frameworks for funding, program management, and governance. Staff's recommendations for those aspects of the IEDR are described below.

5.1 General Recommendations for an Integrated Energy Data Resource

Staff proposes that the Commission require the design, development, and implementation of a statewide IEDR that will collect, integrate, analyze and manage a wide variety of standardized energy-related information from the State's utilities and other sources. Integrating such information in one location will enable DER providers, utilities, government agencies, and others to more readily develop valuable technical and business insights by using queries and other functions to filter, aggregate, analyze, and generate useful information. Those insights will in turn lead to faster and better policy, investment, and operational decisions that will accelerate realization of New York State's REV and CLCPA goals.

Staff finds that this recommendation for an IEDR is the best and least-cost strategy for achieving the resource capabilities and features (delineated below) needed to timely provide useful access to useful information. Furthermore, Staff concludes that perpetuating the fragmented structure and governance of the existing framework will prevent any possibility of achieving satisfactory usefulness at an affordable cost and within an acceptable timeframe. In contrast to the existing framework, the IEDR concept will provide opportunities to reduce overall ratepayer costs by: taking advantage of economies of scale; minimizing the duplication of implementation and operating costs among all entities; reducing the costs to implement and maintain satisfactory levels of accessibility, data quality and uniformity; and, minimizing the costs to plan, implement, and maintain new capabilities needed to enable use cases that emerge in the future. In addition, the IEDR will substantially reduce DER provider costs related to identifying and characterizing investment and operating opportunities that benefit DER providers, the utilities, and utility customers. The IEDR concept also provides opportunities to significantly accelerate progress by focusing attention and resources on one shared platform; minimizing the duplication of efforts among the utilities; and, greatly simplifying statewide governance and coordination of resource planning and implementation efforts.

The IEDR concept also provides opportunities to significantly accelerate progress by: focusing attention and resources on one shared platform; minimizing the duplication of efforts among the utilities; and, greatly simplifying statewide governance and coordination of resource planning and implementation efforts. For example, the IEDR would enable utilities to simplify

[39] The MVDS concept described by the DER Industry Group Report is discussed in Section 2.3 and outlined in Figure1: MVDS Data Categories and Elements.

and accelerate their obligations to provide many required DSIP information items in a timely and uniform manner that meets Commission expectations.

The centralized platform provided by the IEDR should be a trusted resource that the State's energy stakeholders can use to efficiently access and analyze the statewide grid and customer information elements that are most useful to them. Furthermore, to promote used confidence and maximize user benefits, the IEDR should be recognized as the "single source of truth" for each type of information in the system. The IEDR should also allow administrators to configure and manage multiple, distinct access control profiles for a variety of user types. For instance, the access controls for a DER provider and a government entity should differ significantly.

In addition to collecting and housing the data, the IDER should provide a collection of analytic tools that would enable users to design and run useful queries and calculations that operate across all the data types in the system. The number and functionality of those tools will increase over time to align with the various use cases that develop. In addition, to comply with the data privacy and protection framework adopted by the Commission, the users' access to the IEDR's various tools will be governed by access controls that align with the legitimate needs of each user type while also preventing unwarranted access to information that does not serve those legitimate needs.

The IEDR should also perform other functions to produce additional useful information that is derived from the information acquired from its outside sources. One such function, running as an automated background process, should compensate for the large amount of missing consumption interval data (due to the lack of widely implemented smart metering) by synthesizing estimated customer interval data based on the customer's monthly consumption and the generic load profile for the customer type. Another function, run by users on-demand, should calculate monthly bill estimates based on a customer's energy usage data and digitized tariff parameters. The IEDR should also use real and synthesized customer interval data to calculate network demand at user-specified grid locations.

The design, operation, and management of the IEDR should readily accommodate adding new information sources, information types and functions as new market and utility needs emerge. Over time, the IEDR should evolve to include useful information and functions related to weather, demographics, zoning, building attributes, land attributes, property taxes, real estate values, locations of environmental justice areas, EV registrations, EV charger types and locations, EV charger loads, localized grid load-serving capacity, DER aggregations by operator, DER aggregations by grid service, and power quality measurements.

Relational information that describes the relationships among the various information elements in the IEDR will materially affect the users' ability to find, analyze, and generate useful information. For example, with the right relational information maintained in the IEDR, stakeholders could identify energy consumers who are served concurrently by two separate

and unaffiliated energy suppliers. While a lot of valuable relational information can and should be provided by the IEDR's information sources, the IEDR should also be able to continually analyze its various data sets to generate additional relational information that is not obtainable from those sources.

To ensure and maximize the usefulness of the IEDR's data elements, all information providers should fully align the attributes of each provided data element with standards for the attributes required to meet the needs of the use cases enabled by the IEDR. Important attributes that significantly affect a data element's usefulness - including temporal granularity, spatial granularity, precision, accuracy, age, and uniformity – should all meet or exceed minimum levels of adequacy for each use case that employs that data element.

As part of this proceeding, the Commission should establish a comprehensive Data Access Framework to govern the means and methods for accessing and protecting all types of energy-related information.[40] The Data Access Framework is expected to include policies that specify the approaches and criteria for determining whether any given actor is trustworthy and has a legitimate reason for accessing and using any given type of data. Policies within the Data Access Framework are also expected to stipulate when and how to implement constraints that minimize threats to confidentiality and security. All aspects of implementing and operating the IEDR must comply with the policies comprising the Data Access Framework.

To more fully explain the dimensions of the proposed IEDR program, Staff describes in detail below, the principal components of the program lifecycle including regulatory actions, program oversight, program sponsorship, program management, solution architecture, detailed design, implementation, and ongoing operation.

5.2 Regulatory Actions

The Commission should recognize the need for tasks and investments to be completed by each utility company to enable their business and operating systems to gather and transmit data to the IEDR, as well as to support the IEDR's design, development, and implementation.

Given the potential impact of the IEDR on the achievement of New York State's energy policies, Staff recommends that NYSERDA be appointed as the "Program Sponsor." The Program Sponsor should obtain and administer the funding required to carry out the steps described below. Funding should be provided from all jurisdictional electric and gas ratepayers. This includes the initial funding needed to implement the IEDR as well as ongoing funding for operating and enhancing the IEDR. Staff anticipates that the Long Island Power Authority (LIPA) and the New York Power Authority (NYPA), will engage in the IEDR development and implementation process. This will allow LIPA and NYPA to align the various energy-related

[40] Consistent with the Commission's directive in the Instituting Order, the whitepaper regarding development of a data access policy framework contains Staff's recommendations relating to this policy framework.

data activities under their control with the statewide IEDR ultimately directed by the Commission. At a minimum, LIPA and NYPA should consider the development of systems and processes that would enable their respective input to the MVDS to be provided to the IEDR to maximize benefits of the resource to New York State.

Staff is currently working with NYSERDA to issue a Request for Information (RFI) to obtain the information needed to inform the Commission on the expected expenditures necessary to build and operate the IEDR. The Commission should use such information, as well as information obtained through the comment process on this whitepaper, to set an overall budget cap to be managed by the Program Sponsor and to understand the sequence and timing of work and expenditures by all program participants. The Program Manager should be required to submit to the Program Sponsor detailed budgets and schedules for each aspect of building the IEDR. The Program Manager and Program Sponsor should administer competitive procurements to achieve the most efficient design, build and operation of the platform. The procurement decisions made at various points in the program lifecycle should consider inputs from the utilities and other stakeholders, with final selection being the responsibility of the Program Sponsor and DPS Staff.

To address the efforts and tasks that each utility will need to carry out, Staff seeks comment from the utilities on the ability of their respective systems and processes, as they exist today, to provide to the IEDR the data items listed in Appendix B (which includes the elements comprising the MVDS). Those comments should include descriptions and best cost estimates of the required changes that would enable the utilities to fully provide the recommended data elements to the IEDR. Each utility should also describe and quantify its currently planned investments and operating expenses that the proposed IEDR could reduce or eliminate (for instance, costs associated with Green Button Connect and the Utility Energy Registry). The Commission can use all this information to formulate and implement the appropriate processes for submitting, reviewing, and recovering the costs of those necessary efforts and investments. From the outset and over time, the utilities' respective IEDR-related investments should be planned and closely coordinated to achieve the schedule to design, build, and operate the proposed IEDR.

5.3 Program Oversight

The launch and progress of the proposed IEDR program should be overseen by well-qualified persons who are tasked with effectively and timely monitoring program execution and providing guidance to the Program Sponsor and Program Manager as needed to help ensure program success. As described below, these people should be organized into two groups, a "Steering Committee" and an "Advisory Group."

5.3.1 Steering Committee

The Program Sponsor should convene and work with a Steering Committee, comprising five members of DPS Staff and four members of NYSERDA staff, to timely review and when

necessary act on: program issues that require Steering Committee awareness and possible actions or decisions; significant program risks that require management and mitigation; planned and unplanned deviations from the program scope, schedule, or budget; and, upcoming program milestones – especially those that depend on Steering Committee actions or decisions. The Steering Committee should also timely review all Advisory Group inputs and ensure that those inputs are appropriately incorporated into the program's various workstreams.

The Steering Committee should begin by meeting every month, with remote participation enabled by a virtual meeting technology such as WebEx or Microsoft Teams. As the program matures and stabilizes, the frequency of Steering Committee meetings could decrease to bi-monthly and then to quarterly. Steering Committee members should participate personally - substitutions or proxies should be prohibited. The Steering Committee should continue performing its functions over the life of the IEDR.

5.3.2 Advisory Group

The Program Sponsor should convene and work with an Advisory Group to enable stakeholder groups to timely provide informed commentary and guidance to the Steering Committee. Advisory Group members should be selected by the Steering Committee and should represent all relevant stakeholder groups including, but not limited to, DER developers, utilities, energy consumers, state and local government entities, and interested industry associations. The number of Advisory Group members should ensure adequate representation across stakeholder groups while remaining manageable.

The scope of Advisory Group activities should include timely reviews and guidance related to: IEDR use cases and their respective requirements; priorities and schedules for enabling use cases; planned IEDR capabilities; required stakeholder capabilities; user interfaces and experience; IEDR development and testing; program governance; and upcoming program milestones – especially those that depend on Advisory Group guidance. In addition, Advisory Group members should act as testers whenever user acceptance testing (UAT) is performed. Furthermore, appropriate Advisory Group members should be included as participants in any IEDR stakeholder surveys, focus groups, feedback sessions, or workshops.

The Advisory Group should begin by meeting every month, with remote participation enabled by a virtual meeting technology such as WebEx or Microsoft Teams. The Advisory Group's meetings should be scheduled to occur midway between the Steering Committee's scheduled meetings to ensure enough time for transfers of information to and from the Steering Committee. Advisory Group members should participate personally - substitutions or proxies should be prohibited. As the program matures and stabilizes, the frequency of Advisory Group meetings could decrease to bi-monthly and then to quarterly. The Advisory Group should continue performing its functions over the life of the IEDR.

5.4 Program Sponsor

The Program Sponsor is the person or group within New York State government that is assigned responsibility for defining, initiating, overseeing, and facilitating the IEDR Program on behalf of the State. As noted above, Staff recommends that NYSERDA be appointed as the Program Sponsor. The Program Sponsor's principal duties include:

(1) creating the Program Charter (containing the Program's purpose, scope, guiding principles, objectives, participants, roles, and responsibilities);
(2) convening and working with the IEDR program Steering Committee;
(3) convening and working with the IEDR program Advisory Group;
(4) specifying, procuring, and administering the services provided by a professional Program Manager;
(5) providing the means and methods for expending the Commission-directed funding related to the program;
(6) monitoring adherence to the Program Charter by all program participants; and,
(7) helping the Program Manager investigate and resolve issues that could negatively affect the program's costs, schedule, or benefits.

5.5 Program Manager

The Program Manager is the entity responsible for organizing and administering IEDR implementation. Program management services specified by the Program Sponsor and performed by the Program Manager should include the following functions:

5.5.1 Advisory Group Engagement & Communication

The Program Manager should develop, implement, facilitate, and document a rigorous Advisory Group engagement and communication process to inform and guide all phases of the program lifecycle.

5.5.2 Develop and Manage the Program Schedule

Effective oversight of the program's progress will require development and timely maintenance of a comprehensive schedule that:

(1) identifies all significant activities related to planning, designing, building, testing, and commissioning the IEDR;
(2) describes the dependencies among those activities;
(3) establishes the planned timing of each activity;
(4) specifies the entity responsible for performing the activity; and,
(5) quantifies the resource(s) needed for the activity.

5.5.3 Develop and Manage the Program Budget

The Program Budget should encompass all Commission-directed expenditures related to planning, designing, building, administering, and operating the IEDR. Following approval of the

Initial Program Schedule, the Program Manager, working with the Program Sponsor and other entities as needed, should develop an Initial Program Budget that describes the type, purpose, predicted timing, and estimated amount of all significant expenditures.

As the program progresses, the range, scale, and timing of program expenditures will come into better focus; consequently, the Program Manager and Program Sponsor should regularly meet to review actual and predicted program expenditures and to determine whether budget and / or scope modifications are needed.

5.5.4 Procure and Manage Professional Services

The Program Manager should be responsible for developing and executing the strategy for procuring and managing all professional services needed to build and operate the IEDR. Guiding principles for the procurement strategy include obtaining best overall value for New York State and involved stakeholders, with an eye toward accelerating implementation timelines, reducing initiative cost & risk, and protecting robustness of agreed-upon scope through partnering with high-quality service providers that have values aligned with those of New York State.

The Program Manager should identify opportunities for obtaining economies of scale and/or scope from any contracting required to obtain needed professional services, in order to afford the team decision-making flexibility that enables best possible procurement execution. The bucketing of the work to be done that is described in this whitepaper (by function and general timing) does not necessarily mean that each functional need or project phase or service provider will be a different entity or contracted for separately.

Successful IEDR implementation will depend on professional services that enable:

(1) development of the IEDR architecture;
(2) development and integration of detailed designs and specifications;
(3) deployment and integration of components and services;
(4) testing and commissioning the IEDR's capabilities;
(5) system administration; and,
(6) system operations.

5.5.5 Procure IEDR Components

The Program Manager should be responsible for timely procuring and distributing all equipment, software, materials, facilities, network services, platform services, and other elements needed to fully implement the IEDR core.

Guiding principles for the IEDR's component procurement strategy include obtaining best overall value for New York State and involved stakeholders, with an eye toward accelerating implementation timelines, reducing initiative cost & risk, and protecting

robustness of agreed-upon scope through sourcing high-quality components to be deployed during the IEDR implementation.

The Program Manager should identify opportunities for obtaining economies of scale and/or scope from any contracting required to obtain needed IEDR components, in order to afford the team decision-making flexibility that enables best possible procurement execution. The bucketing of the work to be done that is described in this whitepaper (by function and general timing) does not necessarily mean that the IEDR components needed for each functional need or project phase or service provider will be contracted for separately or from different entities.

Procuring the elements that are not part of the IEDR core environment - mostly being the utility-specific elements that are separately deployed, operated, and maintained by the participating utilities – should be the responsibility of the utilities and other program participants.

5.5.6 Coordinate Work Performed by Program Contributors

The Program Manager should act as the primary coordinator of work performed by program contributors to plan, design, deploy, test, commission, and operate the IEDR elements that are not part of the core IEDR environment.

5.5.7 Manage Program Risks

By applying best practices for managing program risks, the Program Manager should organize and conduct the activities needed to facilitate timely anticipation and mitigation of risks that could hinder or prevent successful IEDR implementation.

5.5.8 Program Reporting

The Program Manager should implement and maintain a program reporting framework that includes: (1) monthly production and publication of reports that address all aspects of the IEDR program; (2) ongoing maintenance of a program dashboard that presents an at-a-glance summary of program status; and, (3) frequent briefings to the Program Sponsor, Steering Committee, and Advisory Group. Program reports should, in the context of the program schedule and budget, describe and explain (where necessary) the program's accomplishments and expenditures to date, current work and expenditures in progress, the latest program risk assessment and mitigation plan, and upcoming work and expenditures.

5.6 Solution Architecture

The IEDR Solution Architecture will provide the information needed to fully specify the requirements for a complete IEDR Design. To ensure realization of the IEDR's potential value, the Solution Architect should employ an approach structured around identifying, understanding, and prioritizing potential IEDR use cases.

Details for such an approach are described below in Sections 5.6.1 – 5.6.7. In addition, the Solution Architect must rigorously identify and comply with all applicable requirements concerning confidentiality and system security, as established in the *Data Access Framework for Strategic Use of Energy-Related Data*.

5.6.1 Stakeholder Engagement

Working within the Advisory Group engagement process implemented and managed by the Program Manager, the Solution Architect should obtain inputs on: (1) possible IEDR use cases from all potential user categories; and, (2) technical and business considerations from utilities, third party data providers, platform developers/integrators, and prospective IEDR users.

5.6.2 Identify and Characterize Beneficial IEDR Use Cases

A use case would be particularly beneficial if it can materially improve or accelerate investment, operational, and/or regulatory decisions related to DERs, energy efficiency, environmental justice, and/or electrification strategies for transportation and buildings, thereby facilitating faster fulfillment of one or more of New York State's REV and CLCPA objectives.

The Solution Architect should identify and characterize the beneficial use cases that can be enabled or enhanced by the capabilities of a suitably designed IEDR. In doing so, consideration should be given to the needs and interests of multiple user categories including (but not limited to):

- DER developers;
- DER operators;
- electric and gas utilities;
- electric and gas customers;
- EV suppliers;
- EV owners/operators;
- developers and operators of EV charging infrastructure;
- developers and suppliers of building electrification solutions;
- developers and suppliers of energy efficiency solutions;
- municipal and county governments; and,
- various New York State government agencies and authorities (NYSERDA, DPS, Department of Environmental Conservation, Department of Transportation, NYPA, LIPA, etc.).

The use cases considered by the Solution Architect should include (but not be limited to):

- Use Cases Supporting Development and Use of DERs:
  - identifying, evaluating, and selecting potential DER locations;

- identifying, evaluating, and engaging potential DER customers;
- preparing and optimizing DER development plans;
- preparing and optimizing DER operating plans;
- designing, implementing, and operating DER aggregations;
- monitoring and evaluating the deployment and use of DERs; and,
- designing and implementing Community Distributed Generation (CDG) solutions.

- Use Cases Supporting Transportation Electrification:
  - identifying, evaluating, and engaging existing EV owners/operators;
  - identifying, evaluating, and engaging potential EV owners/operators;
  - monitoring and evaluating EV acquisitions and uses;
  - identifying, evaluating, and selecting potential locations for EV charging facilities;
  - preparing and optimizing plans for developing EV charging facilities;
  - preparing and optimizing plans for operating EV charging facilities; and,
  - monitoring and evaluating the deployment and use of EV charging facilities.

- Use Cases Supporting Building Electrification:
  - identifying, evaluating, and engaging energy consumers and energy managers in existing buildings;
  - identifying, evaluating, and engaging energy consumers and energy managers in planned buildings;
  - monitoring and evaluating acquisitions and uses of building electrification solutions;
  - building energy benchmarking;
  - identifying, evaluating, and selecting opportunities for building electrification;
  - preparing and optimizing plans for developing building electrification solutions;
  - preparing and optimizing plans for operating building electrification solutions; and,
  - monitoring and evaluating the deployment and performance of building electrification solutions.

- Use Cases Supporting Energy Efficiency (EE):
  - identifying, evaluating, and engaging customers with existing EE solutions;
  - identifying, evaluating, and engaging potential EE customers;

- monitoring and evaluating EE acquisitions and uses;
- building energy benchmarking;
- identifying, evaluating, and selecting EE opportunities;
- preparing and optimizing plans for deploying EE solutions;
- monitoring and evaluating the deployment and use of EE solutions; and,
- designing and implementing Community Choice Aggregation (CCA) solutions.

- Use Cases Supporting Utility Functions (Electric and Gas):
  - system planning;
  - DER interconnection;
  - system operations;
  - market enablement;
  - market operations;
  - customer programs and services; and,
  - regulatory/statutory compliance.

- Use Cases Supporting Local Government Functions:
  - building energy benchmarking;
  - Community Choice Aggregation;
  - Community Distributed Generation;
  - facility siting and permitting;
  - environmental justice initiatives;
  - economic development; and,
  - planning and zoning.

- Use Cases Supporting State Government Functions:
  - energy-related R&D;
  - regulatory research and planning;
  - regulatory oversight;
  - building energy benchmarking;
  - facility siting and permitting;
  - environmental justice initiatives; and,
  - economic development.

5.6.3 Identify and Characterize Use Case Requirements

For each beneficial use case, the Solution Architect should identify and characterize the IEDR functions, data source(s), data types, data attributes, data relationships, data access

controls, system components, system attributes, system interfaces, technical processes, business processes, and people needed to enable the use case. Moreover, in addition to describing the system requirements, the Solution Architect should identify and characterize the policy, regulatory, statutory, and governance conditions needed to enable the use case.

5.6.4 Develop Preliminary Use Case Solutions

Based on the use case requirements, the Solution Architect, assisted by other entities as needed, should develop a preliminary use case solution for each use case. The preliminary use case solution should include: (1) a profile that describes the use case characteristics and requirements; and, (2) text, tables, and diagrams that present a preliminary use case design that is detailed enough to inform the use case feasibility and prioritization assessments that will follow (see sections 5.6.5 and 5.6.6).

Each preliminary use case solution should identify, describe, and explain the need for each of the following solution elements:

Functions

The types of functions described for any given use case could include (but not be limited to): data acquisition; data management; data normalization; data grooming; database queries; data generation; cybersecurity; user-controlled functions; operator-controlled functions; data presentment; and, data exports. The description of each function should indicate whether the function is unique to the use case or is shared by other use cases.

Resources

The types of resources described for any given use case could include equipment, software, facilities, network links, system services, datasets, and people. The description of each resource should indicate whether the resource is unique to the use case or is shared by other use cases.

Policies

It is possible that enabling a use case would require one or more policy conditions that don't currently exist at the state and/or local level. For example, necessary policy conditions could involve practices, rights and/or obligations affecting data sourcing, data access controls, data management methods, and consumer protection. In some cases, a needed policy condition would require modification of an existing regulation or law; in other cases, it might be necessary to create a new regulation or law. The description of each policy requirement should indicate whether the requirement is unique to the use case or is shared by other use cases.

Roles and Responsibilities

Every IEDR use case will require a framework of roles and responsibilities spanning multiple people and organizations. The roles and responsibilities involved in a use case would include, for example, the end-users, the data provider(s), the data manager, the access

administrator, the system operator, and functional process administrator(s). In some cases, a role and its respective responsibilities could readily fit within the functions/capacities of an existing organization and/or person(s). In other cases, it might be necessary to either modify the functions/capacities of an existing entity or create a new entity. The description of each role connected to the use case should indicate whether the role is unique to the use case or is shared by other use cases.

Use Case Costs

Implementing and sustaining an IEDR use case will incur capital and/or operating costs for each of the solution elements described above. The description of each cost should indicate whether the cost is unique to the use case or is shared with other use cases. Costs should be an important factor considered in the assessment of use cases and their respective solutions. In addition, to the extent that it is possible and practical, the timing of each use case cost should be predicted relative to the beginning of use case implementation.

5.6.5 Assess Use Case Feasibility

Based on the preliminary use case solutions, the Solution Architect and Program Manager should jointly evaluate the feasibility of each use case. Factors affecting the feasibility assessments should include each of the solution design elements described in the previous section (functions, resources, policies, roles and responsibilities, and funding). Then, each use case should be assigned to one of the following categories of feasibility:

- feasible and readily implemented;
- feasible following resolution of any minor technical/business/policy constraints;
- feasible following resolution of any technical/business/policy constraints that are significant but solvable; and,
- not feasible due to significant technical/business/policy constraints that are not solvable.

5.6.6 Prioritize the Feasible Use Cases

Based on the preliminary use case solutions and feasibility assessments discussed above, the Solution Architect, Program Manager, and Program Sponsor should jointly determine the appropriate priority level for each feasible use case. The prioritization process should consider and compare: (1) the benefits derived; (2) the resource and process requirements; (3) the policy, regulatory, statutory, and governance requirements; (4) the relationship between time and feasibility; and, (5) the estimated costs to design, deploy, and operate the supporting resources and processes.

5.6.7 Develop the IEDR Solution Architecture

Guided by the Program Manager and Advisory Group as needed, and in accordance with the schedule and work-product requirements specified in the Solution Architecture Contract, the Solution Architect should develop and recommend an IEDR Solution Architecture that will facilitate timely and efficient design, deployment, and operation of each planned IEDR use case. All aspects of the recommended Solution Architecture should be detailed enough to enable subsequent development of a complete IEDR Design. Acceptance of the recommended Solution Architecture should be subject to review and approval by the Program Manager and Program Sponsor.

5.7 IEDR Design

The IEDR design will provide the information needed to fully implement the IEDR. With assistance provided by the Solution Architect as needed, the Program Manager should: (1) specify the professional services needed to develop a comprehensive IEDR design; (2) identify several organizations that are well qualified to provide those design services; (3) solicit and evaluate competitive proposals from those organizations; (4) select the preferred service provider; (5) negotiate and sign a contract that is mutually acceptable to the Program Sponsor, the Program Manager, and the selected Design Contractor; (6) oversee the Design Contractor's performance for the duration of the engagement; and, (7) administer the budgeting, reporting, payment, change control, and risk management processes related to the Design Contractor's services.

5.7.1 Prepare a Preliminary Design Plan

Before developing the detailed IEDR design requirements, the Solution Architect should prepare a Preliminary Design Plan that describes the elements, structure, timing, deliverables, and estimated cost of the design effort.

5.7.2 Specify Required Design Services

Following approval of the Preliminary Design Plan, the Solution Architect, assisted by other entities as needed, should specify the detailed requirements for fully designing the IEDR. The complete IEDR design will comprise descriptive text, specifications, tables, diagrams, configuration parameters, data definitions, data schemas, computer code, operating procedures, and other work products that describe and explain all aspects of the IEDR's composition, configuration, and operation. The scope of the complete design should encompass the IEDR and all the other entities (systems and people) that will interact with the IEDR. The finished design should provide all the information needed to specify, procure, and execute all necessary IEDR implementation services. The Program Manager should procure the necessary design services based on the requirements specified.

5.7.3 Design Schedule

Effective tracking and management of the design effort will require development and timely maintenance of a schedule that identifies the planned design activities, describes the dependencies among those activities, and establishes the planned timing of each activity. The sequence and timing of the design activities should result in delivery of design work products that will enable a timely, priority-driven, multi-phase IEDR implementation. To help inform the Program Manager's procurement decision, each prospective Design Contractor's proposal should include a preliminary design schedule.

5.7.4 Advisory Group Engagement

Working within the Advisory Group engagement process managed by the Program Manager, the Design Contractor should employ technical conferences and other methods as needed to obtain design-related inputs from utilities, third party data providers, platform developers/integrators, and prospective IEDR users.

5.7.5 Develop the Complete IEDR Design

The Design Contractor - with guidance from the Program Manager, Solution Architect, and Advisory Group as needed - should develop the complete IEDR design in accordance with the Design Schedule and the design requirements specified in the Design Contract. All aspects of the IEDR design should comply with the approved Solution Architecture and should be detailed enough to fully enable acquisition, deployment, testing, and operation of all IEDR elements.

5.8 IEDR Implementation

IEDR implementation comprises full deployment, integration, and activation of all elements needed to fully implement the IEDR. With assistance provided by the Solution Architect and Design Contractor as needed, the Program Manager should: (1) specify the professional implementation services needed to fully implement the comprehensive IEDR design; (2) identify several organizations that are well qualified to provide those implementation services; (3) solicit and evaluate competitive proposals from those organizations; (4) select the preferred Implementation Contractor; (5) negotiate and sign a contract that is mutually acceptable to the Program Sponsor, the Program Manager, and the selected Implementation Contractor; (6) oversee the Implementation Contractor's performance for the duration of the implementation; and, (7) administer the budgeting, reporting, payment, change control, and risk management processes related to the Implementation Contractor's services.

5.8.1 Prepare a Preliminary Implementation Plan

Before developing the detailed IEDR implementation requirements, the Solution Architect, assisted by the Design Contractor as needed, should prepare a Preliminary

Implementation Plan that describes the elements, structure, timing, deliverables, and estimated cost of the implementation effort.

5.8.2 Specify Required Implementation Services

Following approval of the Preliminary Implementation Plan, the Solution Architect, assisted by the Design Contractor and other entities as needed, should specify the detailed requirements for fully implementing the IEDR.

5.8.3 Implementation Schedule

Effective tracking and management of the implementation effort will require development and timely maintenance of a schedule that identifies the planned implementation activities, describes the dependencies among those activities, and establishes the planned timing of each activity.

To help inform the Program Manager's procurement decision, each prospective Implementation Contractor's proposal should include a preliminary implementation schedule. The selected Implementation Contractor and the Program Manager - assisted by the Solution Architect, Design Contractor, and System Operator as needed - should then finalize and agree to a mutually acceptable implementation schedule during contract negotiations.

5.8.4 Advisory Group Engagement

Working within the Advisory Group engagement process managed by the Program Manager, the Implementation Contractor should obtain implementation-related inputs from the utilities, third party data sources, providers of system components and services, and the System Operator.

5.8.5 Build and Activate the IEDR

The Implementation Contractor - with guidance and assistance provided as needed by the Program Manager, Solution Architect, Design Contractor, and System Operator - should acquire, deploy, test, and commission all IEDR elements as designed and in accordance with the Implementation Schedule.

5.9 IEDR Operation

IEDR operation comprises all the planning, scheduling, system administration, process control, monitoring, maintenance, access control, problem detection/resolution, change management, user support, and reporting activities needed to effectively manage the functionality and performance of operational IEDR capabilities. With assistance provided by the Solution Architect and Design Contractor as needed, the Program Manager should: (1) specify the operating services needed to fully manage ongoing IEDR functionality and performance; (2) identify several organizations that are well qualified to provide those operating services; (3) solicit and evaluate competitive proposals from those organizations; (4) select the preferred System Operator; (5) negotiate and sign a contract that is mutually acceptable to the Program

Sponsor, the Program Manager, and the selected System Operator; (6) oversee the System Operator's performance for the duration of the contract; and, (7) administer the budgeting, reporting, payment, change control, and risk management processes related to the System Operator's services.

5.9.1 Prepare a Preliminary Operating Plan

Before developing the detailed IEDR operating requirements, the Solution Architect and Design Contractor should jointly prepare a Preliminary Operating Plan that describes the elements, structure, timing, deliverables, and estimated cost of anticipated operating services.

5.9.2 Specify Required Operations Services

The System Operator should be responsible for: (1) performing the processes needed to fully operate the IEDR; and, (2) coordinating the IEDR's interactions with processes running in other systems that interact with the IEDR. Also, before any IEDR capability is commissioned for use, the System Operator should be responsible for developing, performing, and documenting the results of acceptance tests of each related IEDR operating function.

Following approval of the Preliminary Operating Plan, the Solution Architect, assisted by the Design Contractor and other entities as needed, should specify the detailed requirements for operating the IEDR.

5.9.3 Operations Schedule

Tracking and managing IEDR operations effectively will require a schedule that identifies and integrates the planned operating activities of all supporting entities, describes the dependencies among those activities, and establishes the planned timing of each activity.

To help inform the Program Manager's procurement decision, each prospective System Operator's proposal should include a preliminary operations schedule.

Once IEDR implementation begins, the Program Manager, Solution Architect, Design Contractor, Implementation Contractor, and System Operator (the Program Team) should meet periodically to assess the System Operator's progress in: (1) developing detailed IEDR operating plans; (2) preparing detailed plans for testing IEDR operating functions; (3) assembling the resources needed for running IEDR operations; and, (4) testing IEDR operating functions.

5.9.4 Advisory Group Engagement

Working within the Advisory Group engagement process managed by the Program Manager, the System Operator should obtain operations-related inputs from the utilities, third party data sources, providers of system services, and IEDR users.

5.9.5 Operate the IEDR

IEDR operations should commence and evolve as the Implementation Contractor releases IEDR capabilities to the System Operator for testing, commissioning, management, and

support. Once an IEDR capability is activated, the System Operator should perform all the operating functions needed to achieve the functionality and performance specified for that capability. Operating functions performed by the System Operator should include (but not be limited to) planning, scheduling, system administration, process control, performance monitoring, system maintenance, access control, problem detection, problem resolution, change management, user support, and reporting.

Once IEDR operations begin, the Steering Committee and Advisory Group should periodically assess the System Operator's performance for each of the operating functions identified above and act as needed when performance falls short of expectations.

6 Summary

The need to provide useful access to useful energy data to enable achievement of the State's energy policy goals is apparent. The timing to provide such access has become urgent with the recent adoption of the CLCPA. Evolving the existing fragmented framework will not meet the needs of New York State's energy industry stakeholders in the most efficient and effective manner. Staff's proposal for an IEDR, and associated development, build and implementation process, will meet those needs efficiently and effectively by taking advantage of economies of scale; minimizing the duplication of implementation and operating costs; reducing the costs to implement and maintain data quality and uniformity; and, effectively planning, implementing, and maintaining new capabilities needed to enable use cases that emerge in the future. Staff recognizes the complexities involved in IEDR development. While Staff does not propose a specific timeline for IEDR readiness, Staff's intent is to be as expeditious as possible, while at the same time remaining flexible in order to take best advantage of new information during the development process, including information gained from comments and from the NYSERDA RFI. Staff will file this whitepaper for public comment, and requests that stakeholder comments follow the organizational structure of this whitepaper in order to facilitate the analysis of issues presented in each section.

Appendix A: Currently Available Online Utility Information Resources

Web links to all of the online utility information sources are publicly accessible via the System Data page of the JU web site (https://jointutilitiesofny.org/system-data/). A consolidated inventory of those links is provided below.

Contents

Distributed System Implementation Plans

On June 30, 2016 each utility filed its Initial Distributed System Implementation Plan (DSIP) under the REV Proceeding, and the Joint Utilities of New York (JU) filed a Supplemental DSIP on November 1, 2016. Each utility filed its first biennial DSIP update on July 31, 2018. The utilities are required to file their second DSIP updates by no later than June 30, 2020. The 2018 DSIP updates and the 2016 Supplemental DSIP can be accessed in PDF format via the links below.

Central Hudson Gas and Electric

Main Document

http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7bA3E2E565-871B-4651-966B-127DF1325283%7d

Appendices

http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7bA4B04F0C-8642-45C2-88CF-BCD9F3F1ACF2%7d

Consolidated Edison

Complete Document
http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7bDE23C0BF-CF5C-4D31-BF9A-E9AC36FD659B%7d

National Grid

Complete Document
http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7b1007E9DC-166C-4EF9-9B85-B55F4FA2EFB1%7d

NYSEG and RG&E

Main Document
http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7b6D4F931F-B10D-438F-8288-2A77DBEDD364%7d

Appendix A: Guidance Requirements
http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7bF4D348AB-6EDB-4B24-B050-1ABF84142DBE%7d

Orange & Rockland

Complete Document
http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7bADD94704-5754-41A6-9CB9-3D35D589A294%7d

Joint Utilities' Supplemental DSIP:

Appendix A

Complete Document

https://jointutilitiesofny.org/wp-content/uploads/2016/10/3A80BFC9-CBD4-4DFD-AE62-831271013816.pdf

Capital Investment Plans

The utilities' respective Five-Year Capital Investment Plans are filed with the DPS and posted on the DPS public web site under various DPS Proceedings. Copies of the utilities' most recently filed plans can be downloaded in PDF format from the following links:

Central Hudson Gas & Electric

2020-2024 Corporate Capital Forecast, filed July 1, 2019 under Case #:17-E-0459/17-G-0460:
http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7b5013C4CA-FB03-4EA1-B48C-048ED88FAF1F%7d

Con Edison

2017-2021 Capital Investment Plan filed under Case 113-E-0030:

https://jointutilitiesofny.org/wp-content/uploads/2017/05/JU-Website-Con-Edison-Report-on-2016-Capital-Expenditures-and-2017-2021-Electrical-Capital-Forecast-1.pdf

National Grid

2018-2022 Capital Investment Plan filed under Case 12-E-0201:

https://jointutilitiesofny.org/wp-content/uploads/2017/05/JU-Website-National-Grid-TD-CIP-Case-12-E-0101-01312017.pdf

NYSEG/RG&E

Capital Investment Plan filed under Case 07-M-0906 can be found at the following link provided by the Joint Utilities of New York web site:
http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7b958AC6D3-CB0F-450A-BD4F-19F1FEA87A93%7d

Orange & Rockland

2018-2022 Capital Investment Plan filed under Case 18-E-0067:
http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7b393DE155-035C-4584-9F5B-C1AA6A78D667%7d

Appendix A

Planned Resiliency and Reliability Projects

The utilities' most recently published plans for resiliency and reliability projects are described in their latest reliability reports filed with the New York Public Service Commission.

Central Hudson Gas & Electric

2017 Annual Reliability Report filed March 29, 2018 under Case 18-E-0153:
http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7bB533CC02-6F9A-4033-8048-A0DDEBB29DBC%7d

Con Edison

2016 Annual Report on Electric Service and Power Quality filed March 31, 2016 under Case 18-E-0153:

https://jointutilitiesofny.org/wp-content/uploads/2017/06/JU-Website-2015-Annual-Report-on-Electric-Service-and-Power-Quality-Con-Edison.pdf

National Grid

2017 Annual Electric Reliability Report filed March 29, 2018 under Case 18-E-0153:

http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7b7B0CED6F-B37A-4E49-BC3E-0827D636FFE4%7d

NYSEG/RG&E

2017 Annual Reliability Report filed March 31, 2016 under Case 18-E-0153:

http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7b2C1D818E-074B-4ED3-B643-CF8A989CCD6F%7d

Orange & Rockland

Service Reliability Report for 2017 System Performance filed April 13, 2018 under Case 18-E-0153:

http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7b6DB7740F-6B4D-43CF-BAF1-D40128A9D5F6%7d

Appendix A

Reliability Statistics

The utilities' most recently published reliability statistics are described in their latest reliability reports filed with the New York Public Service Commission.

Central Hudson Gas & Electric

2017 Annual Reliability Report filed March 29, 2018 under Case 18-E-0153:
http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7bB533CC02-6F9A-4033-8048-A0DDEBB29DBC%7d

Con Edison

2016 Annual Report on Electric Service and Power Quality filed March 31, 2016 under Case 18-E-0153:

https://jointutilitiesofny.org/wp-content/uploads/2017/06/JU-Website-2015-Annual-Report-on-Electric-Service-and-Power-Quality-Con-Edison.pdf

National Grid

2017 Annual Electric Reliability Report filed March 29, 2018 under Case 18-E-0153:

http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7b7B0CED6F-B37A-4E49-BC3E-0827D636FFE4%7d

NYSEG/RG&E

2017 Annual Reliability Report filed March 31, 2016 under Case 18-E-0153:

http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7b2C1D818E-074B-4ED3-B643-CF8A989CCD6F%7d

Orange & Rockland

Service Reliability Report for 2017 System Performance filed April 13, 2018 under Case 18-E-0153:

http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7b6DB7740F-6B4D-43CF-BAF1-D40128A9D5F6%7d

Appendix A

Hosting Capacity

The Joint Utilities, with guidance from stakeholders in the 2016 engagement group discussions, developed a four-stage Hosting Capacity implementation roadmap. The most recent release, Stage 3, of the Hosting Capacity displays now includes sub-feeder level analyses of large-scale solar PV systems interconnecting to distribution circuits. Each circuit's hosting capacity is determined by evaluating the potential for power system criteria violations as a result of large PV solar systems interconnecting to three phase distribution lines with an AC nameplate rating greater than or equal to 300 kW interconnecting to three phase distribution lines. More information on the analysis criteria, assumptions, FAQs and relevant background can be found in the Joint Utilities of New York web site at:

https://jointutilitiesofny.org/wp-content/uploads/2020/03/JU-DRAFT-Stage-3.0-Reference-Materials-2020-02-26.pdf

Central Hudson Gas & Electric

https://www.cenhud.com/my-energy/distributed-generation/

Con Edison

https://www.coned.com/en/business-partners/hosting-capacity

National Grid

https://ngrid.portal.esri.com/portal/home/signin.html?returnUrl=https%3A//ngrid.portal.esri.com/SystemDataPortal/NY/index.html

NYSEG and RG&E

http://iusamsda.maps.arcgis.com/apps/webappviewer/index.html?id=2f29c88b9ab34a1ea25e07ac59b6ec56

Orange & Rockland

Accessible with an O&R account or ARCGIS account

https://www.oru.com/en/business-partners/hosting-capacity

Appendix A

Beneficial Locations

Each utility's beneficial locations, where there may be a capacity benefit on the distribution system from distributed energy resources, are described either on their respective web sites or in their Initial Distributed System Implementation Plans (DSIPs) filed with the New York PSC on June 30, 2016.

Central Hudson Gas & Electric

Provided in the Solar Energy and Distributed Generation page of their web site:

Granularity: Circuit, Substation, Transmission

http://www.cenhud.com/dg

Con Edison

Provided in their interactive hosting capacity map:

Granularity: Substation and Circuit

https://www.coned.com/en/business-partners/hosting-capacity

National Grid

Provided in the NWA tab of their System Data Portal:

Granularity: Circuit

https://ngrid.portal.esri.com/portal/home/signin.html?returnUrl=https%3A//ngrid.portal.esri.com/SystemDataPortal/NY/index.html

NYSEG and RG&E

Provided in their 2018 DSIP update:

Granularity: Circuit

http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7b6D4F931F-B10D-438F-8288-2A77DBEDD364%7d

Orange & Rockland

Provided in their interactive hosting capacity map:

Granularity: Circuit

https://www.oru.com/en/business-partners/hosting-capacity

Appendix A

Load Forecasts

The methods for accessing distribution load forecast data, and the characteristics of those data, vary by utility.

Central Hudson Gas & Electric

Provided on their Distributed Generation web portal:

http://www.cenhud.com/dg

Con Edison

Provided on their Distributed System Platform web portal: https://www.coned.com/en/business-partners/hosting-capacity

National Grid

Provided via the Company Reports tab of their System Data Portal: https://ngrid.portal.esri.com/portal/home/signin.html?returnUrl=https%3A//ngrid.portal.esri.com/SystemDataPortal/NY/index.html

NYSEG and RG&E

Provided in response to an emailed request to **NYRegAdmin@avangrid.com**.

Orange & Rockland

Provided via their interactive hosting capacity map:

Granularity: System, Area Station

https://www.oru.com/en/business-partners/hosting-capacity

Appendix A

Historical Load Data

The methods for accessing historical distribution load data, and the characteristics of those data, vary by utility.

Central Hudson Gas & Electric

Provided on their Distributed Generation web portal:

Granularity: Circuit

http://www.cenhud.com/dg

Con Edison

Provided on their Distributed System Platform web portal:

Granularity: System

https://www.coned.com/en/business-partners/hosting-capacity

National Grid

Provided via the Company Reports tab of their System Data Portal:

Granularity: Circuit
https://ngrid.portal.esri.com/portal/home/signin.html?returnUrl=https%3A//ngrid.portal.esri.com/SystemDataPortal/NY/index.html

NYSEG and RG&E

Historical load data are not currently available to the public.

Orange & Rockland

Provided via their interactive hosting capacity map:

Granularity: Area, Station

https://www.oru.com/en/business-partners/hosting-capacity

Non-Wires Alternatives (NWA) Opportunities

Non-Wires Alternatives can defer or eliminate the need for transmission & distribution infrastructure upgrades, meeting the dynamic needs of the electric system while reducing future rate pressure. Each of the following utility web sites provides the latest details about the utility's respective NWA opportunities and related solicitations.

Central Hudson Gas & Electric

Provided on their Non-Wires Alternative Opportunities web page:

https://www.cenhud.com/contractors/non-wires-alternative-opportunities/

Con Edison

Provided on their Non-Wires Solutions web page:

https://www.coned.com/en/business-partners/business-opportunities/non-wires-solutions

National Grid

Provided on their Non-Wires Alternatives web page:

https://www.nationalgridus.com/Business-Partners/Non-Wires-Alternatives/

NYSEG and RG&E

NWA information for NYSEG**:**

https://www.nyseg.com/wps/portal/nyseg/networksfooter/ourcompany/!ut/p/z0/hZBBawIxEIX_SnvYo0xW24JHEbGIW6kgrLksMYzpaDoTk7jt_vvu4sGe2tv3hsfHY0BDDZpNS85kEja-z3v90kzKavH6NFdvm_VmrN7Vajmd7raTXVnCCvRfBTUYxrGaVw50MPljRHwUqOUarXwGw91RJGP8z1MOHjpdLnoG2gpn_M5Qc5fQGRebu65Qv5ltE9GTOXhMGFuyWKjbgTzl7iFEOaHNqVADSeiBhUdfFDEZ3-_i_hEtJghnfXj27vEH4-cYgg!!/

NWA information for RG&E:

http://rge.com/SuppliersAndPartners/NonWiresAlternatives/ProjectOpportunities.html

Orange & Rockland

Provided on their Identified Non-Wires Alternatives Opportunities web page:
https://www.oru.com/en/business-partners/business-opportunities/non-wires-alternatives

Also provided on their Interactive Hosting Capacity Map:

https://www.oru.com/en/business-partners/hosting-capacity

Appendix A

Distributed Generation DG Information

Each utility monthly files with the New York Public Service Commission an updated SIR Inventory Report that presents the utility's DG interconnection data (queued and installed) in MS Excel and PDF formats. Those reports are accessible via the Department of Public Service's SIR Inventory Information web page:

http://www3.dps.ny.gov/W/PSCWeb.nsf/All/286D2C179E9A5A8385257FBF003F1F7E?OpenDocument

Appendix A

SIR Pre-Application Information

SIR Pre-Application information is provided to interconnection applicants on request and following registration on the utility-specific web sites listed below.

Central Hudson Gas & Electric

https://www.cenhud.com/dg/submit_interconnection_application

Con Edison

https://www.coned.com/en/save-money/using-private-generation-energy-sources/applying-for-interconnection

National Grid

https://www9.nationalgridus.com/niagaramohawk/business/energyeff/4_app-pkg.asp

http://arcg.is/28XscPy

NYSEG

https://www.nyseg.com/wps/portal/nyseg/saveenergy/!ut/p/z1/tZNBb4IwFID_yi4cSatY1CNzBGcUpsiAXkilHauRgrVz-u8ti3HbQVmW2Ntr3nv9-vUVYJAALMieF0TxSpCNjlNsZ1Zn5o57I-gH06AL53DiDYfRwnInfRDfSnBCBPBf6uGV5cC2-leAAc6FqtU7SMVxxwpSyGxXEqmYYLI4GvBXIPKMC1Htvy5oQMp3SvLVh2K0aFLO25XYcMEe6koqLUGfUOecgnRo07xjMWK-dbvI7FmImStkM5NarI_yFSU5s5rseDTLvGnw6EyzUeAv3WQJUgP6aeh6jrfI_IthA44ZoUwaMGwg3TPk8w_Cp29C70J4W3vjBd-2GjeYLQ_X1iPVDP1rHV5sBOI9Z58gEpUstcXwfx7nkbvQJ91f6RiCSdu06e_A19stdvTMVUKxgwLJnYauLqOoHFilmcA1KsrBwfTiE750pUE!/dz/d5/L2dBISEvZ0FBIS9nQSEh/?current=true&urile=wcm%3Apath%3A%2Fnysegagr_smartenergy%2Fsmartenergy%2Fnc_innovation%2Fdistributedgeneration%2Fonline%2Bportal

RG&E

http://www.rge.com/SuppliersAndPartners/distributedgeneration/distributedgenerationonlineportalapplication.html

Orange & Rockland

https://www.oru.com/en/save-money/using-private-generation-energy-sources/applying-for-interconnection

Appendix B: Recommended IEDR Data Items

The following table lists Staff's recommended data items to be acquired, integrated, managed, analyzed and made accessible by the proposed IEDR.

The column labelled "Data Category" indicates whether a data item is represented by structured data (organized and sortable numbers, letters, words, and phrases) or unstructured data (documents, diagrams, images, and video items that are characterized by metadata).

The column labelled "Program Phase" indicates when the data item should be implemented in the IEDR. The number "1" indicates that the data item should be included as a part of the initial IEDR implementation. The number "2" indicates that the data item should be implemented at a later time, based on use case priorities. All data elements comprising the DER Industry Group's recommended Minimum Viable Data Set (MVDS) are incorporated within the set of data elements tagged with a "1".

Data Items	Data Category	Program Phase
Substation Details		
substation ID	structured	1
utility ID	structured	1
NYISO zone	structured	1
NYISO transmission node	structured	1
street address	structured	1
GIS coordinates	structured	1
Substation Bus Details		
bus ID	structured	1
substation ID	structured	1
utility ID	structured	1
Bus voltage	Structured	1
bus protection details	structured	1
bus-connected transformer IDs	structured	1
bus-connected circuit IDs	structured	1
Substation Transformer Details		
transformer ID	structured	1
substation ID	structured	1
utility ID	structured	1
transformer type	structured	1
transformer manufacturer	structured	1
transformer model	structured	1
transformer configuration	structured	1

Appendix B

Data Items	Data Category	Program Phase
transformer high-side bus ID	structured	1
transformer low-side bus ID	structured	1
transformer high-side voltage	structured	1
transformer low-side voltage	structured	1
transformer protection details	unstructured	1
transformer nameplate load rating	structured	1
transformer load factor	structured	1
transformer hourly load historical data	structured	1
transformer hourly load forecast data	structured	1
Circuit Details		
circuit ID	structured	1
connected substation ID(s)	structured	1
connected substation bus ID(s)	structured	1
utility ID	structured	1
NYISO zone	structured	1
NYISO transmission node	structured	1
nominal circuit voltage	structured	1
minimum load	structured	1
average load	structured	1
average daily peak load	structured	1
average time of daily peak load	structured	1
annual peak load	structured	1
annual peak load date-time	structured	1
load rating at the substation	structured	1
load factor at the substation	structured	1
circuit hourly load historical data	structured	1
circuit hourly load forecast data	structured	1
circuit length	structured	1
circuit protection details	unstructured	1
historical hosting capacity at the substation	structured	1
forecast hosting capacity at the substation	structured	1
historical hosting capacity at end of line	structured	1
forecast hosting capacity at end of line	structured	1
hosting capacity calculation methodology	unstructured	1
hosting capacity calculation inputs	unstructured	1
hosting capacity constraint reason(s)	unstructured	1
Service Transformer Details		
service transformer ID	structured	1
connected circuit ID	structured	1

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Data Items	Data Category	Program Phase
connected phase(s)	structured	1
GIS coordinates	structured	1
utility ID	structured	1
NYISO zone	structured	1
NYISO transmission node	structured	1
transformer type	structured	1
transformer manufacturer	structured	1
transformer model	structured	1
transformer configuration	structured	1
transformer high-side voltage	structured	1
transformer low-side voltage	structured	1
transformer nameplate rating	structured	1
transformer load factor	structured	1
date installed	structured	1
Electric Service Point Details		
service point ID	structured	1
street address	structured	1
GIS coordinates	structured	1
utility ID	structured	1
NYISO zone	structured	1
NYISO transmission node	structured	1
connected circuit ID	structured	1
connected service transformer ID	structured	1
interconnection power rating	structured	1
meter ID	structured	1
service voltage	structured	1
number of phases	structured	1
average load	structured	1
average peak	structured	1
peak times	structured	1
load factor	structured	1
local energy value	structured	1
local capacity value	structured	1
applicable NWA opportunity ID	structured	1
measured consumption interval data	structured	1
synthesized consumption interval data	structured	1
hosting capacity at service location	structured	1
Electric Customer Details		
account ID	structured	1
utility ID	structured	1

Appendix B

Data Items	Data Category	Program Phase
service point ID	structured	1
service class	structured	1
customer name	structured	1
postal address	structured	1
phone number	structured	1
email address	structured	1
current tariff/program ID	structured	1
monthly billed demand	structured	1
monthly billed energy	structured	1
monthly billed service charge	structured	1
system peak load capacity contribution	structured	1
system peak load transmission contribution	structured	1
North American Industry Classification System (NAICS) code	structured	1
account start date	structured	1
account end date	structured	1
Electric Meter Details		
meter ID	structured	1
service point ID	structured	1
utility ID	structured	1
meter manufacturer	structured	1
meter model	structured	1
meter serial number	structured	1
meter configuration profile ID	structured	1
date installed	structured	1
date removed	structured	1
metering service provider ID	structured	1
Gas Service Point Details		
service point ID	structured	1
street address	structured	1
GIS coordinates	structured	1
utility ID	structured	1
connected pipeline ID	structured	1
interconnection flow rating	structured	1
meter ID	structured	1
average demand	structured	1
average demand peak	structured	1
demand peak times	structured	1
interconnection load factor	structured	1
applicable NPA opportunity ID	structured	1
measured consumption interval data	structured	1

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Data Items	Data Category	Program Phase
synthesized consumption interval data	structured	1
Gas Customer Details		
account ID	structured	1
utility ID	structured	1
service point ID	structured	1
service class	structured	1
customer name	structured	1
postal address	structured	1
phone number	structured	1
email address	structured	1
current tariff/program ID	structured	1
monthly billed demand	structured	1
monthly billed energy	structured	1
monthly billed service charge	structured	1
North American Industry Classification System code	structured	1
account start date	structured	1
account end date	structured	1
Gas Meter Details		
meter ID	structured	1
service point ID	structured	1
utility ID	structured	1
meter manufacturer	structured	1
meter model	structured	1
meter serial number	structured	1
meter configuration profile ID	structured	1
date installed	structured	1
date removed	structured	1
metering service provider ID	structured	1
Steam Service Point Details		
service point ID	structured	1
street address	structured	1
GIS coordinates	structured	1
utility ID	structured	1
connected pipeline ID	structured	1
interconnection rating	structured	1
meter ID	structured	1
average demand	structured	1
average demand peak	structured	1
demand peak times	structured	1

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Data Items	Data Category	Program Phase
interconnection load factor	structured	1
measured consumption interval data	structured	1
synthesized consumption interval data	structured	1
Steam Customer Details		
account ID	structured	1
utility ID	structured	1
service point ID	structured	1
service class	structured	1
customer name	structured	1
postal address	structured	1
phone number	structured	1
email address	structured	1
current tariff/program ID	structured	1
monthly billed demand	structured	1
monthly billed energy	structured	1
monthly billed service charge	structured	1
North American Industry Classification System code	structured	1
account start date	structured	1
account end date	structured	1
Steam Meter Details		
meter ID	structured	1
service point ID	structured	1
utility ID	structured	1
meter manufacturer	structured	1
meter model	structured	1
meter serial number	structured	1
meter configuration profile ID	structured	1
date installed	structured	1
date removed	structured	1
metering service provider ID	structured	1
Grid Sensor Details		
sensor ID	structured	1
utility ID	structured	1
circuit ID	structured	1
nearest service point ID	structured	1
sensor type	structured	1
sensor manufacturer	structured	1
sensor model	structured	1
sensor configuration profile ID	structured	1

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Data Items	Data Category	Program Phase
sensor time-series measurement data	structured	1
sensor time-stamped event data	structured	1
date installed	structured	1
date removed	structured	1
Power Quality Event Details		
event ID	structured	1
utility ID	structured	1
sensor/meter ID	structured	1
event type	structured	1
event beginning date-time	structured	1
event end date-time	structured	1
Installed DER Details		
DER ID	structured	1
service point ID	structured	1
customer account ID	structured	1
site address	structured	1
site GIS coordinates	structured	1
utility ID	structured	1
current tariff/program ID	structured	1
DER type	structured	1
DER nameplate rating	structured	1
inverter type	structured	1
inverter nameplate rating	structured	1
inverter manufacturer	structured	1
inverter model	structured	1
inverter configuration	structured	1
owner ID	structured	1
operator ID	structured	1
historical power interval data	structured	1
forecast power interval data	structured	1
synthesized historical power interval data	structured	1
synthesized interval data	structured	1
date installed	structured	1
date removed	structured	1
Queued DER Details		
interconnection request ID	structured	1
interconnection queue position	structured	1
interconnection status	structured	1
utility ID	structured	1

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Data Items	Data Category	Program Phase
circuit ID	structured	1
customer account ID	structured	1
site address	structured	1
site GIS coordinates	structured	1
planned current tariff/program ID	structured	1
DER type	structured	1
DER nameplate rating	structured	1
inverter type	structured	1
inverter nameplate rating	structured	1
inverter manufacturer	structured	1
inverter model	structured	1
inverter configuration	structured	1
owner ID	structured	1
operator ID	structured	1
forecasted power interval data	structured	1
planned operational date	structured	1
Forecasted DER Details		
forecasted DER ID	structured	1
utility ID	structured	1
circuit ID	structured	1
nearest service point ID	structured	1
nearest service point GIS coordinates	structured	1
forecasted DER type	structured	1
forecasted DER capacity	structured	1
forecasted power interval data	structured	1
forecasted operational date	structured	1
Registered Electric Vehicle Details		
VIN	structured	2
state registration ID	structured	2
state registration street address	structured	2
GIS coordinates for registration address	structured	2
EV type	structured	2
EV manufacturer	structured	2
EV model	structured	2
EV model year	structured	2
compatible charger type(s)	structured	2
maximum EV charging power (W)	structured	2
EV battery capacity (kWh)	structured	2
efficiency (miles per kWh)	structured	2
estimated annual miles	structured	2

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Data Items	Data Category	Program Phase
registration start date	structured	2
registration end date	structured	2
Forecasted Electric Vehicle Details		
proxy EV ID	structured	2
zip code	structured	2
GIS coordinates for zip code post office	structured	2
EV type	structured	2
compatible charger type(s)	structured	2
estimated maximum EV charging power (W)	structured	2
estimated EV battery capacity (kWh)	structured	2
estimated efficiency (miles per kWh)	structured	2
estimated annual miles	structured	2
registration start date	structured	2
registration end date	structured	2
Installed Electric Vehicle Charger Details		
charger ID	structured	2
service point ID	structured	2
utility ID	structured	2
owner ID	structured	2
operator ID	structured	2
location category	structured	2
street address	structured	2
GIS coordinates	structured	2
charger access category	structured	2
charger class level	structured	2
number of charger ports	structured	2
charger manufacturer	structured	2
charger model	structured	2
nameplate maximum load rating	structured	2
average daily charging events	structured	2
peak daily charging events	structured	2
average charger load	structured	2
average daily peak charger load	structured	2
average time of daily peak load	structured	2
annual peak charger load	structured	2
annual peak charger load date-time	structured	2
meter ID	structured	2
metering service provider ID	structured	2
metered interval load data	structured	2
date installed	structured	2

Appendix B

Data Items	Data Category	Program Phase
date removed	structured	2
Forecasted Electric Vehicle Charger Details		
proxy charger ID	structured	2
nearest service point ID	structured	2
utility ID	structured	2
location category	structured	2
nearest service point street address	structured	2
nearest service point GIS coordinates	structured	2
charger access category	structured	2
charger class level	structured	2
number of charger ports	structured	2
nameplate maximum load rating	structured	2
forecasted average daily charging events	structured	2
forecasted peak daily charging events	structured	2
forecasted average charger load	structured	2
forecasted average daily peak charger load	structured	2
forecasted average time of daily peak load	structured	2
forecasted annual peak charger load	structured	2
forecasted annual peak charger load date-time	structured	2
forecasted date installed	structured	2
Registered ICE Vehicle Details		
VIN	structured	2
state registration ID	structured	2
state registration street address	structured	2
GIS coordinates for registration address	structured	2
vehicle type	structured	2
vehicle manufacturer	structured	2
vehicle model	structured	2
vehicle model year	structured	2
fuel type	structured	2
fuel efficiency	structured	2
estimated annual miles	structured	2
registration start date	structured	2
registration end date	structured	2
Forecasted ICE Vehicle Details		
proxy vehicle ID	structured	2
zip code	structured	2
GIS coordinates for zip code post office	structured	2

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Data Items	Data Category	Program Phase
vehicle type	structured	2
fuel type	structured	2
estimated fuel efficiency	structured	2
estimated annual miles	structured	2
registration start date	structured	2
registration end date	structured	2
Existing Building Details		
building ID	structured	2
service point ID	structured	2
utility ID	structured	2
street address	structured	2
GIS coordinates	structured	2
building owner	structured	2
building property manager	structured	2
building type	structured	2
building size	structured	2
zoning classification	structured	2
building energy consumption data - electric	structured	2
building energy consumption data - gas	structured	2
building energy consumption data - other	structured	2
Forecasted New Building Details		
proxy building ID	structured	2
nearest service point ID	structured	2
utility ID	structured	2
street address	structured	2
GIS coordinates	structured	2
building owner	structured	2
building property manager	structured	2
building type	structured	2
building size	structured	2
zoning classification	structured	2
building energy consumption data - electric	structured	2
building energy consumption data - gas	structured	2
building energy consumption data - other	structured	2
Forecasted Building Modification Details		
building ID	structured	2
service point ID	structured	2
utility ID	structured	2
street address	structured	2

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Data Items	Data Category	Program Phase
GIS coordinates	structured	2
building owner	structured	2
building property manager	structured	2
building type	structured	2
building size	structured	2
zoning classification	structured	2
building energy modification type	structured	2
forecasted building electricity consumption data	structured	2
forecasted building gas consumption data	structured	2
forecasted building energy consumption data - other	structured	2
Digitized Bulk Power Market Details		
NYISO tariffs	unstructured	1
NYISO DR Manual	unstructured	1
NYISO Gold Book	unstructured	1
NYISO zone pricing histories	structured	1
NYISO transmission node pricing histories	structured	1
NYISO DER aggregation rules	unstructured	1
NYISO DER participation rules	unstructured	1
Digitized Distribution Network Value Details		
distribution tariffs	unstructured	1
machine-readable distribution tariffs	structured	1
distribution rate sheets	unstructured	1
machine-readable distribution rate sheets	structured	1
demand response program documents	unstructured	1
locational system relief value tables	structured	1
machine-readable locational system relief value tables	structured	1
BCA Handbook	unstructured	1
value stack calculator link	structured	1
Distribution Investment Plan Details		
utility ID	structured	1
project ID	structured	1
substation ID	structured	1
circuit ID	structured	1
nearest service point ID	structured	1
type of service need	structured	1
amount of service needed	structured	1
project completion date	structured	1
estimated wire-based solution cost	structured	1

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Data Items	Data Category	Program Phase
Distribution NWA Opportunity Details		
utility ID	structured	1
NWA ID	structured	1
substation ID	structured	1
circuit ID	structured	1
nearest service point ID	structured	1
type of service need	structured	1
amount of service needed	structured	1
service need start date	structured	1
service need end date	structured	1
estimated wire-based solution cost	structured	1
NWA value	structured	1
Metadata for Digitized Documents & Other Unstructured Data Items		
item ID	structured	1
item type	structured	1
item source	structured	1
date most recently published	structured	1
update frequency	structured	1
next scheduled update	structured	1
digitized format	structured	1
web link to current version	structured	1
web links to previous versions	structured	1